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ABSTRACT

The 12 articles in this publication provide indepth treatment of important aspects of in-house training programs for technical writing and editing. The articles deal with the following topics: the value of an in-house writing course, teaching in industry, developing an in-house writing course for engineers and scientists, a new approach to teaching writing in industry, teaching writing in private industry, industrial training of technical writers, an advanced in-house course in technical writing, a cure for writer's cramp in engineers, the editors' workshop program at General Motors Research Laboratories, the "pro's" of in-house teaching and how to offset the "con's," and how to make an in-house writing course enjoyable. An epilogue summarizes the main points to be considered in training young engineers and scientists to write effectively. (FL)

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ANTHOLOGY SERIES NO.5

teaching technical writing and editing -

in-house programs that work

James G. Shaw, Editor

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Preface

We need a writing course. Will you teach it?

That question is being raised in more and more organizations where competence in written communication is becoming one of the accepted job responsibilities. And the writing professional or publications manager, already completely absorbed in his own job and not particularly anxious for any addition to his work load, may answer that question with another, although unspoken, question: *How?*

If the need is obvious and understandable, so is the responsive question.

Few writing professionals have been teachers, and those that have are very aware of several points that soon become obvious to the novice instructors. Industrial teaching is far different from the university teaching they have known as students or instructors. The needs are different, the students are different, and the results expected are far different. It follows, very logically, that the teaching must be different.

Granted the truth of the old adage that good writing is good writing no matter what the type, it is undeniable that technical writing is a specialty of its own and that the type of technical writing needed by a particular company is even more specific. Reconciling these facts with his own situation, and putting them both within the framework of good writing practice is the job of the industrial writing instructor.

This book has been compiled to help him in his task. Drawn from the writings and papers of many veteran STC members*, reviewed and selected by editors who have been down the in-house teaching road many times themselves, its 12 papers discuss preliminary considerations, the development of in-house training programs, and the preparation of advanced and related programs in detail. The book concludes with an epilogue that summarizes succinctly the main points to be considered in training young engineers and scientists to write effectively.

The papers are well diversified for subject matter, and all of them are noteworthy for their specialized, in-depth treatment of important aspects of in-house training programs for technical writing and editing. We have not included an index of subjects treated within the various papers because the treatment of these sub-subjects, such as that on the duties of a course administrator in Henrietta Tichy's *The Consultant-Instructor Speaks* and the material on outlining in Margaret Blickle's *Training Young Engineers and Scientists for Written Communications,* is best considered within the context of the entire paper where its true perspective can be evaluated. In other words, the total is much stronger than the sum of its parts.

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*as published in the Proceedings of the Annual Technical Communication Conference of the Society for Technical Communication (STC) and in the Society's Journal, *Technical Communication.*

The editorial committee that has done the reviewing, selecting, and organizing of these articles is an eclectic group, and intentionally so. The overall objective of each person's scrutiny has been to scan the material through different spectacles, to look at it from viewpoints that each knew was important in terms of his own experience.

Jim Shaw has filled a wide variety of assignments in the writing and technical communication fields, from newsman to technical publicist to publications supervisor to special assignment writer at General Electric. He has paid particular attention to the needs of different audiences and the importance of specialized approaches.

Ernie Mazzatenta is not only a veteran science writer at General Motors Research Laboratories, but has been an instructor in science writing there and at Wayne University for many years. He reviewed the articles from the instructor's viewpoint and was particularly interested in seeing that our collection included material on advanced or "brush-up" courses for the veteran writer. Ernie has long maintained the completely unarguable point that technical writing is advancing so fast that keeping up with the changes is one of the main responsibilities of people in the field.

Fern Rook now teaches technical writing at Arizona State University, but before that she was a technical writer in industry where one of her chief responsibilities was organizing and conducting writing classes. Her industrial background, plus her university experience, emphasize her straightforward approach to technical communication: *Say it briefly, say it correctly, say it completely.*

But, carefully planned as the collection may be there are some gaps in knowledge that it cannot fill, some needs that it cannot meet. Those gaps must be closed by the instructor himself to meet his own specific needs. To meet them he must be aware, and stay aware, of the constant changes in his own industry and in the writing field. To do this means a constant scrutiny of new literature, professional journals, and an objective awareness of changing practices that he sees. Many of the changes that he sees must become part of his teaching pattern.

And he must stay in touch with his management, to know what it really wants him to teach. That *really* is most important. Too many managers think they are getting what they need, when they really aren't sure. A *writing course* may seem to satisfy their need but it isn't much of a definition to a conscientious instructor. Much bad writing in industry can be blamed on managers who don't really know what they want, couldn't define it if they had to, but who blame instructors and writers when they think they aren't getting it.

An in-house instructor can perform no greater service to his students than to get a clear picture of management needs in the written communication field, explain them in his classroom, and develop standards for measuring progress towards meeting them.

Industrial teaching of effective technical writing is a difficult, specialized, frequently frustrating field. But it is a rewarding and important one, too, where successful results are obvious and can be long lasting. To those that essay that road — good luck. Perhaps this book can help you over some of the bumpy stretches.

James G. Shaw
Ernest D. Mazzatenta
Fern H. Rook

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From PROCEEDINGS, 1973

In-House Writing Courses: Aids or Anachronisms?

Ernest Mazzatenta

In-house writing courses can provide numerous "personal" services which can't be obtained in any other way. Because they do, they are more likely to result in better writing from your part-time writers. However, the cost may be more than your company wants to pay for such improvement. If this is the case, the company would do well to encourage its employees to enroll in a good university course offered at night.

Should an in-house writing course be established in your company?

This question inevitably occurs to many company heads, plant managers, and personnel chiefs as they wrestle with the turgid communications of their employees. When the question fails to go away, they usually seek advice from those presumably qualified to dispense it: training officers within the company, instructors of in-house courses at other companies, counselors at nearby night schools, university professors who are part-time consultants, etc.

What often results from all this is a barrage of divergent opinions. These sometimes prompt the manager to forget the question altogether — to say nothing of possible action. And, of course, nothing could be worse for him or his part-time writers.

This paper is aimed at easing such frustration by covering two possible approaches at once, by comparing the in-house course with the outside evening class.

CLASS PROFILES

My daytime class in "Effective Report Writing" is for engineers and scientists and their supervisor-editors at the General Motors Research Laboratories. At night, I guide a class in "Report Writing — Management and Technical" for Wayne State University. Students are working

professionals in various jobs in many different firms.

Each class meets for two hours, once weekly, over 12 weeks. Both classes involve reading assignments from textbooks; projecting and discussing good and bad examples, and writing assignments inside and outside the classroom.

Which of these types would work best for your employees?

THE NIGHT SCHOOL APPROACH

Managers interested in an economical approach should promote enrollment in a good night school course.

They have a better chance of being heard if their company covers part or all of the tuition as many companies do. In the Detroit area, a firm can buy 24 hours of writing instruction for 20 employees at a total cost of $1,000. However, if the company is either unwilling or unable to provide financial support, the employee can deduct the expense as a job requirement (assuming the company makes it one) at income tax time.

This approach also is best if managers would prefer to have their employees participate at their own convenience. Continuing education programs thrive in so many communities today that employees are often able to select from several available evening courses in writing.

By investigating a bit, employees can arrive at the best time, place and instructor, so that "going to school" is practically painless.

Finally, the night school course is best if employees seek a better understanding of the writing being done and the writing problems being encountered at other companies. Student interaction usually leads to the swapping of ideas and to the conclusion that one's own writing problems aren't so awesome after all.

THE IN-HOUSE COURSE

Managers considering this approach must realize that it can involve a substantial company commitment, especially if the class is held during working hours. (See Figure 1.) If this is the case, the company commits the time of an instructor and employee-students to what is considered — by many measures — a non-productive program.

Annual Salary	Cost/Person*
$10,000	$115
13,000	150
16,000	185
19,000	219
22,000	254

*Fringe benefits and overhead costs excluded.

Figure 1. Man-Hour Costs for a 24-Hour Course

Under this arrangement, a company can purchase 24 hours of writing instruction for 20 employees in the $12,000 bracket at a man-hour cost of $2,770. To this cost should be added the cost of an instructor (covering his preparation and class time) and the overhead costs and fringe benefits for the teacher and students.

What can the company expect in return? Here are some of the major advantages:

1. **The in-house course enables your company to reach all or any part of your work force.** You can schedule part of a department, one department, or several departments at one time, whichever is most convenient for your company. It might be wise to merge two departments which work on the same or related projects, especially if they aren't working together very well. By enrolling your people en masse, you are sure to catch your poorest

writers — those most likely to shun an outside course.

2. **The in-house course enables you to interact with the instructor before, during and after each course.** Working together, you can establish goals, set priorities, pinpoint the most pressing problems. Together you can refine and hone the course so that it "fits" the students.

At GM Research, well before a course begins, I ask the involved department managers for a written description of the most common writing problems in their departments. Some not only provide the description but specify each individual's primary shortcomings. All this, of course, is kept confidential. When a course ends, the department heads and their assistants meet with the instructor to review results and discuss possible follow-up action.

3. **The in-house course enables your management to easily monitor the progress of employees.** Monitoring can be done in several ways: Managers can visit, audit or enroll in classes to get a feel for how students are attending and participating. And they can confer with the instructor at other times to determine whether a student is applying himself and actually improving.

4. **The in-house course enables writer-researchers to mingle with their editor-supervisors.** In class, they can come to grips with writer-editor problems in the best way possible: directly. They also gain a better appreciation of their mutual role in the communication process.

5. **The in-house course provides all students with ample opportunities to write on the subjects they know best.** The in-house instructor has little trouble shaping job-related assignments because (1) normally only one main job area is represented in the classroom and (2) he already has some knowledge of the work being done in that area.*

At GM Research, I can assign "a two-page proposal suggesting more work in promising automotive fuels" knowing my students from the Fuels Group have handled similar writing assignments and feeling reasonably confident of my ability to evaluate the content of their papers.

On the other hand, the evening instructor faces a class consisting of people from various job areas in different companies. He has very little, if any, knowledge of these job areas. He has no knowledge of the report forms used, and the chances are that no single form predominates. The instructor may be able to devise a job-related writing assignment which represents a fair challenge to all, but not without considerable strain. This done, he still faces the problem of critiquing the papers.

Dr. John Mitchell of the University of Massachusetts underlined this problem:

"Content analysis is . . . important to a course in communication, but an understanding of the specialist content itself is not always part of an instructor's capability."[1]

Whenever I work up enough courage to assign a job-related report to my current night class, I wind up grappling with details concerning:

telephone installation . . . hydraulic laboratory testing . . . analysis of automotive equipment utilization . . . hospital materials management . . . project engineering . . . and tire quality control and development engineering.

As you might suspect, I do not feed my students a steady diet of job-related writing

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*I not only have access to research reports written by my students, I'm often involved in writing condensed and popularized versions of their reports.

assignments, though I firmly believe that these are the best kind.

6. **The in-house course provides your employees with a continuing source of information and guidance.** At GM Research, I invite "grads" to stop by my office if they have some specific writing problems or if they want me to review their latest paper. Many do — sometimes years after they have completed the course.

7. **The in-house course can be a stepping stone to a more advanced course for your part-time writers or for other needed communication courses.** Max Weber describes his advanced course for the employees of the Argonne National Laboratory.[2] At GM Research, we are putting together lesson plans for a Short Course for Supervisor-Editors. We hope to launch this course later in the year.

In this connection, it should be noted that a writing exercise in recent Effective Writing courses calls for researchers to answer this question:

"What would you like to see incorporated into our planned Short Course for Supervisor-Editors?"

Not surprisingly, this assignment has produced some very eloquent and emphatic replies. They provide plenty of materials for short course lectures on "How to Improve the Writer-Editor Relationship."

SUMMARY

This paper has covered some of the major advantages of the company writing course and the university evening course from the viewpoint of one who teaches both. Managers interested in cultivating the writing skills of their employees should seriously consider both. The outside course may be more convenient for company and employee alike. The in-house course costs more, but generally offers more. Once managers have weighed the advantages in light of their company's needs and resources, they should be in a good position to make the right choice.

REFERENCES

1. John H. Mitchell, *Educators Cannot Go It Alone, Proceedings,* 19th Conference, Society for Technical Communication, Boston, Massachusetts, May 10-13, 1972.

2. Max Weber, *An Advanced In-House Course in Technical Writing,* included herein.

From PROCEEDINGS, 1972

Teaching In Industry: The Consultant-Instructor Speaks

Henrietta Tichy

A major advantage of an experienced consultant-teacher is an objective view of many companies and their courses. What can companies do to improve their courses? Should all writing courses be on the same level? Who should take company courses? Who should teach them? Must all company courses be directly related to the employees' work? Where is education in industry going?

My twenty-five years of teaching writing and editing and of consulting about writing problems in business, industry, and the professions have been happy and satisfying. It has been a pleasure to turn from college freshmen reluctant to spend time learning to write better to engineers eager to learn and willing to work because they are convinced of the importance of writing well. It has been refreshing to discuss with medical doctors and with doctors of philosophy in science, engineering, and business ideas about writing that do not occur to English majors and English teachers. To linger in affectionate nostalgia on those happy experiences is a temptation when I assess the past, but such a review would not improve the teaching of writing in industry, nor would it help future teachers and future administrators of courses. Quicker and more vivid is the posting of warnings at the beginnings of the roads to failure, these warnings being examples of mistakes.

The examples resemble the experience of a friend of mine who is always planning to learn to cook. He has bought dozens of cookbooks indiscriminately — cookbooks of all nationalities, cookbooks of all regions, cookbooks about twenty-minute meals and about dishes that require two days of preparation. He reads the books assiduously, is fascinated by the recipes, and has become a great talker on the art of cooking. But he still eats TV dinners.

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Companies that are still eating TV dinners hear of the success of other companies in improving writing and complain, "Our competitor gets good writing without trying. Maybe we should use his overhead projector," or his formula or his arrangement of course hours. The belief of such a company that its competitor succeeds fortuitously is rivaled in strength only by the company's belief in gimmickry as the answer to writing problems.

When I consult about the writing problems of such a company, I may find a poor book or an inept instructor, but I am more likely to find a competent instructor who is not permitted to teach effectively. An employee of the company, this instructor is more tolerant of waste in the company than I as an outsider am. He is used to company waste — waste of time in meetings, waste of the suggestions of employees, waste of the ability and education of women employees, and waste of machinery and supplies. To him the ineffective course is just more waste that he has no hope of changing. He must be forbearing in his comments on the company interference and lack of cooperation that are ruining his course.

"After all," he tells me, "I have to live with these managers as long as I stay in the company."

"Have you tried to convince them that improving writing is hard work, not just spouting theories or applying panaceas?"

"I've tried many times," he says, "but I'm not heard in the right places. Maybe you can make them listen."

I hope I can.

SELECTING AN INSTRUCTOR

The first step towards effective courses in writing is the selection of a competent instructor. A course administrator should avoid instructors who make outrageous promises of miraculous and speedy improvement. Those promises are the marks of charlatans, and charlatans are expensive and dangerous.

More than once I have been asked to undo their spells. I have been asked to get rid of choppy sentences in the writing of scientists and engineers. I have been hired to help writers who have become unbearably repetitious, who state an idea three times in every paragraph, once at the beginning, once in the middle, and once at the end. I have been implored by a pharmaceutical company to change the letters in its correspondence division where writers had been taught to open every letter with the same cheery phrase. Whether it was a letter to a doctor about the side-effects of a drug or a letter to a congressman investigating abuses, every letter began not with *Dear Dr. Jones* but with *Hello, how are you this lovely morning?*

The highly touted quacks who achieve such disastrous results are easy to recognize by their brazen advertising. The dangerous courses are also easy to recognize by their preposterous promises. Professor Siegfried Mandel warns,

> *In an attempt to crash through the barriers between themselves and good writing, many persons have fallen into the attractive traps of the one-day circuses that come to town under the respectable label of "Institute," or have pounced on the books that promise clear writing in a few easy lessons. Little except self-delusion can be gained by gunning one's intellectual apparatus and hoping to reach the top in a single spurt; the flesh may be willing, but the means are inadequate.*[1]

An administrator should seek an instructor who has adequate education and training in writing or editing, who knows methods of teaching and has taught successfully at an appropriate level, and who has a personality suited to teaching adults at the educational and professional levels of the students in the course. An administrator may settle for less when he hires an instructor, but he should remember that if an instructor lacks some qualifications, the administrator must help the instructor more than he would need to help someone with full qualifications. For example, an administrator who has taught successfully may hire

an instructor without teaching experience, observe the lessons, and counsel the instructor how to teach better.

The personality of an instructor seems to worry administrators more than the other qualifications: they wonder what to seek. A teacher of adults in industry should be flexible. An inventive attitude towards teaching is helpful. And quiet self-confidence places a class at ease. If the students have little education and have been out of school for a long time, an instructor should have a large measure of patience and perseverance. If the students have graduate degrees but need training in the fundamentals of writing, the instructor should be able to use graduate methods even for basic material.

An interview with a prospective teacher can enlighten an administrator who is frank and honest. I have been interviewed for teaching that a high school teacher could do better than I, and I have said so and have helped the administrator find a suitable teacher. But not all administrators are honest and informed. Having heard of my long teaching experience at Esso Research and Engineering Company, a course administrator assured me that his men would be at the Esso level. They were not; only their supervisors were. I trained a competent employee to teach the next course, and I helped him to organize it. But in the meantime I had to teach students that he or a good local high school teacher would have taught much better and much more patiently. At the end of the course I recommended to this company that it train supervisors because they were editing poorly, and the administrator planned a course for supervisors, but a vice president decided without any investigation of costs that a course for supervisors would be too expensive and killed it. Such a mistaken economy measure is wasteful and expensive. Assuming that every good teacher is a good teacher for students at all levels is also an expensive mistake.

CHOICE OF A TEXT

Second to the teacher in importance is the textbook for a course; indeed, the two are closely related. Even the best teacher is hampered by a poor textbook; yet many companies cling to books that discourage good writers and reenforce the worst habits of bad writers. For as long as ten or fifteen years some companies insist on using such books because they were written by vice presidents or board members or by some vicious, small person who retaliates furiously whenever anyone refuses to use his book.

One company manual demanded that all sentences in engineering reports be under thirty words. That manual used sentences of forty and sixty-five words to present writing instruction, which is easier to express in short sentences than is engineering practice. The book, which contained other inconsistencies and some more serious errors, hampered every instructor who tried to use it in a course. The ire of the students who had to count words and the stubborn insistence of their supervisors that engineers follow the book to the letter made a psychologist more necessary than an English teacher.

However, even the most tenacious supervisors retire or change, and so do the writers of manuals. A few months ago a manager of that company asked me to write a new manual for the company.

"I didn't know whether you would talk to me," he said, "because when I once called to ask you to give a course based on our manual, you said that you would not prostitute yourself by using that book."

"I've forgotten those strong words," I told him, "but I'm sure that you are wise to plan a sounder book of instructions."

"Yes," he said, "but I should tell you that I was one of the writers of the old manual."

A course administrator who fortunately does not have to impose a company manual on an

instructor may unfortunately choose a poor book for good reasons. He may, for example, assume that a book published by a reputable publisher is a sound book. In the academic world book buyers are less naive. They examine books carefully. What they find is amazing.

One company of good reputation — at least I hope that its reputation is good, for the company published one of my books — describes the author of a textbook on the back cover of her paperback as *a former college composition teacher ... an educational technologist* and writes of the book, *It's been tested, rewritten and re-tested until we're sure you can teach yourself how to write more clearly.*

Glancing through this book, I came upon an exercise requiring the substitution of a more precise word for a given general word. Sentence One of this exercise reads, *The earthquake was a great surprise to the experts.* The author changes this to *The earthquake shocked the experts.* Sentence Eight reads, *He looked over that book long and hard.* The suggested revision is *scrutinized* or *studied, poured* (sic) *over.* On the same page *giggled* is spelled *griggled.*[2].

Two pages later the author offers some advice that she herself does not take. *A second important principle of good writing,* she states, *is to avoid the word* **not** *whenever possible, unless you want to emphasize a contrast.* Six pages later the author writes, *You wouldn't use a cliche if you realized it was so worn out;* and after that **not** appears often.

Intelligent students are irritated by writers who do not follow their own instructions. Instructors are annoyed by a large number of blunders in a book advertised as *tested, rewritten and re-tested.* For such a publisher and the author of such a book I offer one simple rule (and I am not emphasizing a contrast). "Thou shalt not mislead students."

A course administrator and an instructor working together should be able to find a book that is reasonably consistent and correct and is suited to the students. A primary school handbook will impede advanced students; a college handbook may prove too difficult for students who need elementary instruction. Any effort spent on finding a book at the appropriate level is, therefore, well spent for the benefit of students, who, if they find the book practical, will keep it and refer to it after the course.

DUTIES OF AN ADMINISTRATOR

After he has the right instructor and book, a course administrator still faces a difficult and important task. He must elicit company cooperation for the course. No course can have a lasting effect without it. Even a barely adequate course can have good results with it.

The most essential company action is the expression in words and in deeds of satisfaction with good writing. Once an administrator has helped his company to recognize good writing, he must help it to recognize the importance of good writing. Whatever rewards are given for achievement in science, technology, or administration should be given for achievement in writing.

A course administrator should strive for full company cooperation with the instructor of a writing course even when it is troublesome or inconvenient to do so. If, for example, an instructor wishes to see samples of the writing of the students while he is planning the course, a wise administrator will provide them. They enable the instructor to create a course based on the needs of the students. Some administrators act as though the instructor were trying to get their next promotion or salary increment, not just samples of writing. They should realize that without the samples a teacher can plan a course, but it may not be the course the students need.

A company should supply all the necessary information for an instructor. In many companies it is extraordinarily difficult to identify readers. The writers do not know to whom they are writing, and their supervisors cannot or will not tell them.

"Well, the readers are all technical people," one administrator finally admitted to me.

"Specialists in the fields of the manuals? of the reports?" I asked.

"Well, probably. No, maybe not all of them."

"Specialists in related technical fields?"

"I suppose so. Most of them anyway. But don't worry. You'll find our writers of manuals all know their readers well."

"Is English the native language of all the readers?" I persisted.

He laughed. "That I can promise you. You just ask the writers. They know their readers."

Indeed, the writers did think that they knew the readers of their manuals and reports. Many of the writers had been field technicians and were writing to field technicians who, the writers assumed, were like themselves. But the writers had been in the field ten to twenty years ago, and much had changed in those years — the length and kind of courses given to field technicians, the general education of field technicians, the amount of supervisory help offered to field technicians. A few writers who had been in the field more recently laughed at the ideas of the older writers and helped to correct their misconceptions, but this was slow, painful teaching.

Not until the last weeks of the course did I discover that half the readers of the manuals were using English as a second language and were reading with the help of small pocket dictionaries. That I learned from a golfing companion of an executive of the company — not from anyone in the writing unit.

When I taught again for this company, this time in another part of the United States, the writers also roundly denied that they had any European readers, and many were so stubbornly unwilling to concede the existence of these readers that I had to insist that management enlighten the writers. It did so but only after investigation of the identity of the readers.

At the time I gave these courses I was studying how to write manuals for readers with limited English and might have made many helpful suggestions had not most writers and some managers been intractable on the subject of European readers. The only effective approach to these writers and supervisors was through the central management of the company. Not every instructor has an opportunity to approach the management of a vast company. It is ridiculous, therefore, that such an essential preliminary to writing as the identification of readers should be unknown to some writers and their supervisors, should be ignored by others, and should be difficult for an instructor to ascertain.

But the withholding of necessary information from an instructor does occur, especially in companies that are fearful of change. An honest consultant has to tell such a company that improving writing requires change; it may require changes in the organization of writing, in the contents, in the language used in the company, even in the kind of work space and writing time allotted. If a company is afraid of necessary change, it should not waste money on a writing course.

Cooperating with a course and with an instructor also means securing the good will of the supervisors of writers. The course must be introduced properly to them so that they do not feel threatened by it or suspicious of it. A fearful supervisor may speak disparagingly of the course or of the textbook and thus impede improvement in writing.

In some companies it may be necessary to give courses for supervisors who are poor writers before one can instruct those they supervise. Effective writing filters down in a company without the energy required to force it upward. Some supervisors are so insecure that the administrator

of courses must impress upon them that upper management approves of the course and requests their cooperation. This discourages supervisors from harassment such as calling conferences at the hour the course meets or from telling writers that quality does not matter, only quantity.

A FINAL RESPONSIBILITY

A course administrator has one final important responsibility — to arrange for the proper treatment and reward of writers and instructors. Somehow he must convince his company that the improvement of writing requires long hard work by both writer and instructor. His company must realize that writing that is simple, brief, and readable takes much more time and skill than writing that is pretentious, verbose, and confusing. The reader of good writing saves time because the writer has expended it.

Writers must be protected against company stupidity. Administrators seldom tell chemists or engineers how to perform, but many administrators consider themselves experts on writing. If one were to put together their mistaken ideas — only short sentences are good; the less one understands the better the writer must be; as long as I can understand it, it's good; just write the way you talk — he would have a guide to poor writing. No course can succeed if ill-informed administrators are the judges of excellence in writing. No writer can improve if he is not given time — more time to spend on his writing and a span of time of study and practice.

If the instructor of the writing course is an employee of the company, it may be impossible to arrange the reduction in work load that would free him to prepare the course and correct the papers. The employee who becomes a teacher is usually conscientious and hard working; therefore it may be difficult to convince his supervisor that the instructor must be relieved of some of his responsibilities. Even an understanding supervisor who finds his division pressed may assign too much work to the instructor.

One way to avoid this is to schedule conferences with students for the correction of their papers. This is a good technique for the teaching of writing, and it removes the instructor from his division for a number of hours. Another method is to arrange to pay the instructor for preparing the course and correcting papers on his own time. The hourly rate should be at least the one he earns at his other work, and there should be some bonus because he is working overtime.

If the instructor is not an employee of the company, he must request an adequate fee from the beginning. A good course administrator should arrange an adequate budget for the course and should not haggle if a reasonable fee is requested. An instructor fares better if he refuses to bargain about fees, for most companies are willing to pay well for a good course.

Unfortunately, spurts of economizing may cause even the best companies to try to reduce costs. If an instructor has been giving a successful course and his request is fair, he will probably benefit from refusing to reduce his fee. In twenty-five years I have been asked twice to reduce my fees. As my fee was no more than a first-rate college would pay me, I refused. One company paid me without any quibbling. The other company, which was paying higher hourly rates to undistinguished scientists, refused and, when I proved adamant, hired another instructor for the course. The next year that company eagerly offered me the fee I had requested but had to double it to regain my services. I taught courses at twice my usual fees for that company for many years; and, having tried another instructor, the company was much happier with me than it had been at first when my fees were lower.

Many companies equate the value of services with the price of services; therefore an instructor who asks for too little money gets too low a status. An instructor should remember that he is selling years of experience and training, not just the hours when the course meets.

THE FUTURE

As for the future of writing courses in industry, I might predict as Calvin Coolidge astutely predicted of business, "It will get better or it will get worse."

In the past, industry has copied the format of college classes. I think that in the future courses in industry will depart from the college model. Many courses will be short because leaving one's work for forty hours will be difficult and unnecessary. Highly educated employees can benefit from shorter courses that prepare them to teach themselves.

There may be an increase in liberal arts courses in industry, particularly for the middle-aged scientists and engineers who have reached a dead end in industry and need to refresh their thinking and redirect their careers. For them writing courses may be combined with courses in literature.

An increase in courses is likely. With standards falling in the colleges and fewer colleges requiring courses in writing, industry will have to give courses in writing just to maintain the present level of writing in reports. Improving writing in industry will mean much more instruction than writers now receive.

There will, I hope, be more freedom in writing and speaking. Language, sentence lengths, organization, and formulas hallowed by tradition but inappropriate for much writing will disappear as requirements. Speakers will no longer feel it necessary to adapt material to a sequence of slides whether slides are useful or not. Public relations speakers will no longer deliver carefully memorized speeches and find themselves unable to answer unexpected questions; they will talk with their audiences, not just to them. And finally (oh joy, oh bliss unbounded!) teachers in industry may be permitted to encourage writers to substitute for the dreary papers read at conventions other more effective methods of presenting ideas to audiences.

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From PROCEEDINGS, 1969

Developing an In-House Writing Course for Engineers and Scientists

Carver C. (Bill) Linville

An in-house training program in technical writing for engineers and scientists of the Bureau of Mines Petroleum Research Center in Bartlesville, Oklahoma, is helping them to improve their writing. Simultaneous instruction in English composition and technical writing techniques provides a unique approach to short-course teaching methods. The establishment editor of the Center serves as the instructor of the course, thereby supplementing the 1:1 editor-author relationship. The course is effective in improving the quality of the internal and external written communications of the enrollees.

Effective writing is important to the Bureau of Mines because its output is presented in research reports, and writing research reports of its investigations is one of the Bureau's obligations. In fact, the Bureau of Mines is committed by law to prepare and publish reports of its research.[1]

In addition to support from the Bureau's Office of Mineral Information, individual branches provide training programs which are designed and developed to meet particular needs of administrative and research personnel. These programs include training by the Civil Service Commission. The Bureau's Petroleum Research Center in Bartlesville, Oklahoma, has developed an in-house writing course for its research engineers and scientists. The course helps these professional employees to write research reports that are concise, brief, and easy to read and understand. The subject material, teaching methods, and course outline are described in this paper to show how the course was developed.

Numerous Governmental agencies and industrial organizations offer in-house writing courses; in fact, this kind of training is likely to

replace outside courses on writing and the use of imported consultants.[2] Because of this trend, teaching guides and course outlines should be readily available, but a search of the scientific literature for formats of writing courses revealed little information on the subject. Personal correspondence with some instructors, both academic and in industry, produced some information[2 4 13 15] but reference material on in-house writing courses is scarce.

DESIGNING THE COURSE

When the need for some of the research personnel to improve their writing was apparent, the establishment editor of the Research Center submitted a proposal for the in-house course to the Center's Training Committee. He went first to the Committee to obtain approval of the course through proper channels of organization. Later, copies of the proposal were given to the Research Director and other officers to create interest in the course among management and supervisory personnel.[13 14] These formal presentations gave some prestige to the course at the beginning of the program.

The editor reminded the Committee that authors of the Research Center face numerous problems in writing results of Bureau investigations — the same problems that are faced by other technical, professional personnel.[15] Some of these problems are:

- Distinguishing between the solution of the technical problem and the solution of the communications problem;
- Content selection and organization; designing a report to do a specific job and to serve a specific group of readers;
- Tone and style;[12] selecting words (diction); and structuring sentences to effectively present the ideas and the data to be communicated.

These writing problems become evident almost daily to the Research Center's editor as he reviews technical manuscripts. The proposal suggested that the answer to these problems was in providing methods and means of motivating employees to write more effectively through self-improvement and continuing education.[16] The proposal also contained this information:

- A recent informal survey of employees of the Research Center reflected wide interest in the course.
- The alternatives, e.g., writing seminars, university extension courses, Civil Service Commission courses, were ineffective or too costly.
- Report writing now requires some 15 percent of professional employee's time and production of written material will increase.
- Personal job satisfaction and personal prestige gained by completing the course will increase numbers of manuscripts produced.

In-house courses are most likely to be successful if they avoid fads and gimmicks and focus on certain fundamental principles of all writing, technical or otherwise;[2] consequently, no simple mechanical course with six easy steps to good writing was proposed.

ENDORSEMENT

The Director of Petroleum Research and the Chief, Office of Mineral Information of the Bureau of Mines, endorsed the program. They suggested that the course should emphasize the importance of reader identity. From management's observations, identifying the reader is one of the most difficult tasks for report authors.

SELECTING A TEXT

Texts tend to be either too general or too academic for in-house programs. Much consideration was given to selecting the text[5] and the accompanying workbook;[6] the Harbrace College Handbook is compact and easy to use. Exercises consisting of lively paragraphs provide writing practice. Although the text contains sections on grammar and mechanics of writing, punctuation, and spelling, in this course the following are emphasized:

Effective sentence structure

The paragraph

Planning and writing manuscripts

Word choice (diction)

Editing, rewriting, and polishing

Style and format

Reviewing

Evaluating results of the course

These topics almost automatically provide a course outline; however, the instructor follows a formal, written outline.

Supporting these subjects for the course, Gabbert[4] describes four ingredients of good writing: *It must be understandable, it must be easy to read, it must be informative, and, whenever possible, it should be interesting.*

An informal survey of the Center's research scientists and engineers, similar to that of Mintz[8] showed that respondents had studied English sufficiently to be able to pinpoint their writing weaknesses, but few had completed English courses beyond the college freshman level. Some had studied no English exposition since high school. Their writing weaknesses, based on self-analysis, consisted of wordiness, organizing information and data, sentence structure, lack of clarity, and paragraph structure. This information was helpful in selecting the text.

Reports by others support these findings. Hayakawa[7] stated his observations as a general rule. He said, *When the social function of a learned vocabulary becomes more important to its user than its communicative function, communication suffers and jargon proliferates. We like to put on the dog linguistically to try to impress others.* How true. Some authors write to impress when they should write to express.

THE INSTRUCTOR

The editor of the Research Center serves as instructor of the course. This approach affords advantages and disadvantages as follows:[2]

Advantages. The editor knows and understands the Bureau's policies and procedures for handling manuscripts.

- He knows Bureau personnel both in the field and in the Washington offices who are concerned and involved with communications problems.
- Actual manuscripts are used for discussion.
- Problems of audience, purpose, organization, and tone are examined in terms of real people and real problems.

Disadvantages. Writing cannot be taught or learned in one short course.

- Tangible results expected from management are difficult to produce; only the participants can immediately evaluate the success of the course.
- A major problem facing the instructor is that of initial indifference. Offering the course as a prestige activity approved by management helps to overcome this disadvantage.[10]

ENROLLMENT

The course is offered to professional employees on a limited voluntary enrollment basis. Enrollment is limited to 10 students per class so that the instructor has time to give attention to individual needs. Five research chemists, two research engineers, two physical science technicians, and one physicist were enrolled in the first class.

GOALS AND BENEFITS

Goals of the course are to (1) improve communications skills, with emphasis on reports and research papers; (2) make it easier to complete assignments of writing research reports, and to complete tasks on time; (3) stimulate interest in writing technical articles; (4) make known available publication services, such as drafting, photography, duplicating, etc.

The course offers no panaceas, no simple formulas. The benefits result from positive aspects. (1) Enrollees learn that they know more about their language than they credit themselves; (2) they learn to regard writing as a major part of their job, not as a traumatic experience, and to approach it systematically as they do their research; and (3) that the most critical stages of the writing process are the planning, thinking, and organizing performed before the manual task of writing is begun.

TEACHING METHODS

Group discussion and participation are mostly used as teaching methods, but some lectures are given to help students in following the text. At the beginning of the course, a self-test helps in evaluating the students' needs for reviewing fundamentals of English composition (Table 1). Then, instruction in grammar and syntax is given to meet those needs.

The heart of the course is sentence analysis, practice writing, editing, and discussion of manuscripts. Students provide examples of their writing for review.

COURSE OUTLINE

The course consists of sixteen 1½-hour sessions. A course outline similar to that of Gabbert[4] is followed. Initially, the format and content of some technical writing task is described; an example is shown; then an assignment is given. Upon completion, the assignment is discussed in class. Numerous handouts are prepared in sequence and assembled in a notebook. Handouts include illustrations. Preparation of handouts is time-consuming because only material relevant to petroleum research is used, but this material is helpful not only during the course but also afterward when the notebooks are used as desk references.

Some films are available, but most of them are dated and present fundamental information about writing. A few of the better ones which were borrowed or rented for this course are listed.[3]

Following an intensive review of grammar and syntax, students become familiar with the text material. They also begin to realize their individual needs for further training in grammar and English composition. Assignments for the text and workbook are continued but only for self-instruction, not for class discussion. This is the somewhat unique approach of the course. Following the ninth session, classroom instruction is devoted to specific areas of technical writing, and remaining sessions of the course are used to cover various technical writing subjects (Table 2).

RESULTS AND DISCUSSION

Results of the course are difficult to evaluate in tangible terms. Some of the Research Center's management personnel reported that graduates of the first class improved their writing; others reported evidence of new interest in writing among graduates of the course and other employees. From the editor's viewpoint, the course is successful. An analysis of individual achievement and comparison

with results of initial diagnostic tests are given in Table 3. As a direct result of the course, six of the ten graduates of the first session began writing manuscripts, and two of those manuscripts are completed; however, some of them might have been written without the course. By word of mouth, other employees have learned about the value of the course, and several have applied for future enrollment.

The course was revised after the first experience so that (1) more time is scheduled for practice writing; (2) outside speakers who are experts in their fields (technical illustrators, design specialists, journal editors, printing production specialists, etc.) serve as guest lecturers; and (3) students are required to write term reports for discussion and evaluation by the class near the conclusion of the course.

TABLE 1. Results of Diagnostic Tests

Grade	Sentence structure	Punctuation	Grammar	Diction*
90-100	3	1	3	5
80-89	4	3	6	1
70-79	1	5	1	1
Less than 70	2	1	-	3

*Choice of words for correctness, clarity, and effectiveness.

TABLE 2. Course Outline

Session	Source of instruction	Subject
1	Text	Diagnostic tests: Multiple-choice exercises on sentence structure, punctuation, grammar, and diction.
2	Text	Sentence structure: Recognizing the parts of speech, sentence analysis to reveal misplaced modifiers, uses of verbals, verb distortion, dangling participles.
	Notebook	Assignment: Analyze four sentence structures and rewrite the sentences to correct any faults detected by analysis. Exercises on editing: Sentences containing one or more faults (1) meaning is not clear or not precisely expressed, (2) sentence is wordy, complex, or pretentious, (3) verbs are passive, do not agree in number or have confused tenses, (4) auxiliary verbs are missing. Note: Most of these exercises are selected from research reports.

TABLE 2. Course Outline (continued)

Session	Source of instruction	Subject
3	Text and notebook	Agreement of subject and verb, pronoun and antecedent. Tense and mood, unnecessary shift in tenses; sequence of tenses; should, would, shall, and will.
	Workbook	Assignment: Adjectives and adverbs, case (function of nouns and pronouns), agreement.
4	Workshop Practice writing	Class exercises: Simplicity, rewriting, editing. Examples of poor writing are distributed for correcting. Discussion.
5	Text	Subordination: Short, choppy sentences, illogical subordination. Variety: Varying the length, the beginning, the compound sentence, the subject-verb-object sequence.
	Notebook	Illustrations: Simple writing, hedging, editing for variety, continuity, and cohesion.
	Workbook	Four exercises.
6	Text and notebook	The paragraph: Transitional expressions; linking words and phrases for transition between sentences and paragraphs. Unity, coherence, methods of developing paragraphs.
	Workbook	Three exercises.
7	Workshop Practice writing	Planning the manuscript: State the purpose of writing a report. For each chosen subject write (1) the purpose, (2) an appropriate title, and (3) the central idea or thesis. Examples of thesis sentences are discussed.
8	Text	Organization: Choosing and limiting the subject, outlining.
	Notebook	Illustrations of (1) topic outline, (2) expanded topic outline.[9]
	Workbook	Two exercises.

TABLE 2. Course Outline (continued)

Session	Source of instruction	Subject
9	Workshop Practice writing	From a sample BuMines report, students write a topic and expanded topic outline and explain.
10	Notes	How to write definitions and descriptions: What needs to be defined; formal sentence definition; qualifying phrases; how to amplify a definition; where to use definitions in reports; how to describe a process.
11	Notes	Fixed-formula presentation: Elements of the report; the technical paper; the technical article.
12	Notes	Technical abstracts: Kinds of abstracts, contents, length, uses.
13	Notes	Writing titles and bylines: Using the Engineers Joint Council Thesaurus, students learn how to cue the reader, inform the researcher, and guide the librarian.
14	Notes	Writing the introduction: Status, purpose, method, scope, recognition, and significance statements; how to begin the report; writing the body; major and minor introductions; headings; writing the body; writing the concluding statement.
15	Notes Style manuals	Style: BuMines, American Chemical Society, Government Printing Office, etc.; acknowledgments, references, tables, illustrations.
16	Test	Analysis of individual achievement: Sentence structure; punctuation; grammar; and diction (Table 3).
	Course evaluation	Questionnaire: 10 questions for personal critique of the course covering (1) content and coverage, (b) presentation, (c) relative emphasis on various facets, and (4) suggestions for improvement.
	Presentation of certificates	

TABLE 3. Analysis of Achievement

Grade	Sentence structure	Punctuation	Grammar	Diction
90-100	(3) 5	(1) 2	(3) 8	(5) 7
80-89	(4) 4	(3) 6	(6) 1	(1) 2
70-79	(1) 1	(5) 2	(1) 1	(1) 1
Less than 70	(2) -	(1) -	- -	(3) -

NOTE. — Numbers in parentheses represent results of diagnostic tests given at the beginning of the course (Table 1).

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From PROCEEDINGS, 1967

A Checklist for Writers: A New Approach to Teaching Effective Writing in Industry

James G. Shaw

At one time or another, most of us probably have been asked to conduct a workshop. It may not be identified as a workshop, but the requests are usually the same, ranging from the casual — "Say, will you come and talk to my gang for an hour or so?" — to the desperate — "We're getting a pretty rough time over our reports. Can you give us some help so we can get these people off our backs?"

But whatever the invitation, the message is the same. Somebody is in trouble over his use — or misuse — of the written word and is asking us for help.

Like most writers, I find the missionary flame within me burning brighter at such a request and challenge. A real challenge it is; my first couple of responses to such requests brought home some fundamental facts about teaching effective writing in industry, and the need for a special approach to the problem.

In short, effective writing can't be taught in industry the way most of us learned it. Time is short, pressure is great, and students at best may only have a casual interest or may indeed be attending only after a management directive. Furthermore, the writing for which help is sought will seldom be writing in general, but will rather be specialized to meet a certain type of communication problem.

So, it is seldom practical to spend hours on grammar or punctuation, badly as such instruction may be needed. Neither is the time usually available for extended work on general writing, to develop fluency and organization.

Instead, we have found that work-oriented writing courses must identify the problem promptly, relate it to the class's self-interest, and develop an approach that will encourage the group's active participation.

To do this, we have to assume that the students have a basic familiarity with composition fundamentals and devote our time to focusing that

knowledge on the problem at hand, with as little diversion into the elementals as possible.

THE DETRACTOR SCALE

We have found an effective way of doing this through workshops that are built around the development of a Detractor Scale.

The Detractor Scale is simply a checklist — a positive guide to more effective writing — that is developed from the negative reactions of a group to writing samples it reviews.

The basic idea for such a scale began to develop after I realized what professional teachers of writing have always known: few things are quite as personal to an individual as his own writing, and any critical evaluation of it rapidly becomes a personal challenge. Conversely, most people are ready, willing, and dying for the chance to talk about the faults in the other fellow's writing.

Therefore, we begin a workshop by asking those attending to call out the chief things wrong with written communications they have received in the past few days. These points we call detractors, because they detract from the effectiveness of the written message.

Fifteen or 20 minutes active discussion usually results in my writing down about 20 faults, or detractors, on the blackboard. Then the class quiets down, quite pleased at this unexpected chance to air a lot of deeply suppressed gripes.

At this point, incidentally, I usually find myself feeling a little smug. In all the workshops I have conducted during the past three or four years, I have not found this original Detractor List to differ by more than 10 to 15% in number or name of qualities mentioned.

The next step is to check the class's assertion that this list summarizes and defines the common problems in writing. I pass out a sample communication that is so bad that even the most recalcitrant members wince when they read it. Take your list, I tell them, and identify the detractors in the message by the number of the item on the list.

In a few minutes we compare notes by reading aloud the numbers of the detractors identified. Most of the items on the list are accounted for. But as we go around the class, another fact becomes evident. Nobody has identified all the faults in the sample, and commonly identified faults have been identified for different reasons. Furthermore, it becomes evident that a lot of the originally specified faults are duplications and redundancies.

More discussion reduces the 20 or 25 original items to about 16 that are a lot more significant. Then someone invariably points out that while this list is better than the first it still isn't very useful because the points listed are still so broad. After all, "Ambiguity," "Lack of Sufficient Detail," "Too Many Words," or "Poor Organization" still leave a lot of doors open.

DEVELOPING A CHECKLIST

At this point I broach the idea of an effective checklist that could be used to review drafts of their own material, as they are now reviewing others. We begin to change the negative approach to a positive statement, and to clarify every point on the list with two to four subpoints.

It is surprising how well these subdefinitions can zoom in on a problem. "Poor organization" on the original list develops subpoints like (1) Every communication needs a title, a summary, an introduction, a statement of facts, and a conclusion. (2) A summary should answer most of the six basic questions, who, what, when, where, why and how. It should make it clear what action was or will be taken, and who is responsible for what.

One by one we develop the other points in the same way. For some of them, special exercise sheets help make the points clear. These sheets are planned to make a point by using a humorous example, and then working into more prosaic ones. For example, under the detractor "Bad Grammar"

inevitably appear, with some help from me, I admit, the three or four points all editors will recognize: dangling participles, misplaced modifiers, lack of parallelism, lack of agreement between subject and predicate.

The exercise sheet on dangling participles features this gem: "Swollen by the rain, the workman was unable to free the fallen timbers." After a big laugh, we consider the next one, taken from an actual report: "Assembling the elements of the component correctly, the operation can be properly evaluated."

Four or five of these examples and we develop a basic subpoint: "Be sure that the action in the participle phrase is performed by the subject of the sentence. Don't let the water swell the workman." The last reference to the humorous example helps anchor the point in everyone's mind.

The completed checklist is understandable and useful to all those in the class because they have developed it, and can see its value.

USING THE DETRACTOR SCALE

The next step is to encourage the Scale's actual use. First there is a class session on a sample exercise, with the class underscoring the detractors in colored pencil. Then there is a homework assignment in which class members use the Scale to grade typical writings of their classmates.

This can be a rather bloody session. Since every person in the class uses the same checklist there is, supposedly, no room for disagreement. But there usually is. The list is revised again to clarify points in question. Another revision of a classmate's material usually results in much less disagreement.

By the time seven or eight sessions of a 10-session workshop have passed, we will have had extensive reviews of such major points of effective writing as organization, the handling of references, jargon and specialized vocabularies, and basic editing procedures. Before the workshop ends, the remaining sessions will have delved into general publishing practices, graphics, and the use of the fog count as a measure of readability. The checklist, too, will be a useable reality.

We include the session on the fog count because we have found it extremely useful in emphasizing one major value of our checklist — improved readability. After working and learning to use the checklist, the fog system gives the class members a simple method of determining how well they may be doing from a readability standpoint. Then, the system seems to have a particular appeal to scientifically and technically oriented people, because they live in a world where mathematics and logic are important. The fog system, with its emphasis upon mathematics and statistics, represents a familiar approach to a problem.

ADVANTAGES

In summation, we have found that writing workshops of this type have several advantages. One of the most important of these is flexibility. The same basic approach can be used to cover almost any type writing problem, for any type organization, for any number of sessions. Although we have found it most useful in workshops of six to ten two-hour sessions, there is no reason why it could not be used for shorter ones. Going beyond ten sessions usually means going so deeply into various aspects of writing effectiveness that a more conventional approach is better.

Secondly, a realistic measurement of individual effectiveness is possible. It is extremely difficult, as any one who has taught writing can attest, to come up with a numerical grade that is understandable and acceptable to everyone concerned.

However, if the Detractor Scale is carefully drawn, a built-in mathematical effectiveness count is available. Thus, if a scale of a dozen detractors is developed in class, and if each detractor has three or four subpoints, a total of about 50 measurable factors is provided. Detractors found in

manuscripts can be underscored and identified with the number on the scale, such as 1B, or 2D, or 7C. At the end, all the detractors can be counted and the paper scored as "Plus 7," for example, which means that the author has included seven unnecessary detractors in his manuscript. Also, the Detracto. Scale makes it possible for different people reviewing the papers to reach about the same evaluation. A corollary of this is the numerical evidence of a person's progress; the fewer the detractors, the greater the effectiveness of his writing.

EVALUATIONS

Another evaluation method tried with some success is to delay the last session of the workshop for a month or six weeks. This gives the students a chance to try their newly developed skills in their day-to-day activities, encouraging an awareness and application of the points emphasized in class because the workshop is not yet ended and the final day of reckoning — otherwise known as the submitting of the final marks to their managers — has not yet been passed.

Combining the delayed session routine with the assignment of a project to last as long as the delay can help the use of the Detractor Scale to become a part of daily practice. But the delayed-session practice can backfire, if the delay is too long or if no assignments or reviews are scheduled during the delay to keep the class focussed on the objective at hand. I delayed a final session once, to let an organization get over a particularly heavy workload, without giving any interim assignments. When the class resumed the members were lethargic, and their skills had lapsed nearly to the previous beginning point.

Retention of skill is an important criterion for any type of instruction. A friend who taught rapid reading told me once that it was not unusual for an adept pupil to increase his speed by 1000 percent. Although this began to drop off rapidly after the class terminated, he was pleased if a pupil could retain an improvement of 25 to 50 percent.

The improvement in writing skills through this use of the Detractor Scale works in about the same way. I know that skills can improve substantially during the workshop, but I have never been able to measure retention for long after a workshop terminates nor to relate the value of the improved skills to the progress of the individuals or organization concerned. Yet I know that improvements do result because of telephone calls and letters I receive from managers whose employees have attended the workshop. They say, "My gang seems to be writing better," or, maybe, "I haven't had any customer complaints lately about the poor quality of our reports."

I can see the improvement, too, in material I receive from my former students for publication. And when I see a tattered Detractor Scale scotch-taped to the slide of a desk or to the wall above the office dictionary I have the pleasant feeling that maybe one forward step has and is being taken toward escaping from the morass of impossibly written communication that surrounds us.

I have no illusions that I am really teaching written communication of the type many of my friends teach in colleges or graduate schools. Neither do I have any illusions about the suddenly improved quality that might result. Yet, like most others in this challenging, frustrating and occasionally discouraging world of communication where the written word is king, I love the craftsmanship that a well written sentence represents, the subtleties of meaning that a skilled writer can present.

Sometimes, when I am either more egocentric or perceptive than usual, I like to think that I see such craftsmanship and subtleties in some of my own work or in that of members of the group I supervise. I realize that the chances of developing such skills in my workshop students are slight. And, gradually, I have been able to reconcile the reality and my own interests.

My basic role in these workshops is to help people develop an awareness of the fundamentals

of effective written communication; to show them how such fundamentals can be identified, and how they can be used to make their daily writing more effective.

The people who attend my workshops could not care less about literary craftsmanship. They are concerned with the effective use of the written word as a tool to do a job. If my workshops can help them develop an awareness of the details that will improve their effective use of the written word, I can feel that my workshops are making a real contribution.

In making such a contribution, we are well aware of the oversimplification that many of the points on the checklist can represent, and of the effect such oversimplification can have on the professional sensibilities of experienced writers and grammarians. Yet we know from experience that the chief value of such a checklist is in its oversimplification, and that the people to whom the list is of most value use it because they would not take time to use any of the fine textbooks that are available.

The list provides them with a ready awareness of the major stumbling blocks to effective written communication. Such an awareness, and its corrective implementation in daily writing, is of very real value.

"These points won't answer all your questions," I tell my classes, "but they can help you 75 or 80 percent of the time." To me, that's a pretty good average. In fact, I'd like that kind of a guide on my own job.

THE DETRACTORS CRITERIA LIST FOR EVALUATING REPORTS

First List Developed in Class

1. Purpose not Defined
2. Lack of Basic Detail
3. Irrelevance
4. Redundancy
5. Repetition
6. Weasel Word(s)
7. Technical Terminology is Excessive or Undefined
8. No Summary or Poor Summary
9. Complicated Referencing
10. Poor Readership Identification
11. Format Could be Improved
12. Sentence Too Long
13. Incorrect Grammar
14. Incorrect Spelling
15. Incorrect Punctuation
16. Reread for Sense
17. Verbosity
18. Overblown Words
19. Incorrect Word Usage

DETRACTOR CHECKLIST

DON'T LET THESE DETRACTORS CREEP INTO YOUR NEXT MANUSCRIPT

Final Version of List

1. Poor Organization

1. Every written communication needs a statement of objective, a summary, a logical sequence of ideas, and a conclusion.
2. The summary should answer as many as possible of the six basic questions — who, what, when, where, why, and how.

2. Insufficient Detail

1. Supply exact identification of person or equipment described, as well as location, cost, date, and time, if pertinent.
2. Identify action taken or to be taken and by whom.
3. Supply details of results achieved or expected in terms of understandable values (dates met, dollars, personnel, test results, etc.).

3. Improperly Used Words

1. Do you mean *affect* or *effect*; *principle* or *principal*?
2. Explain jargon with synonyms. Don't use Form No's, groups of letters, etc. as words without explanation.
3. Coined words and/or coined meanings aren't necessary!

4. Overlong Sentences

1. If you use more than 20 words in a sentence, you are probably in trouble.

5. Verbosity

1. Avoid business clichés, deadwood phrases, redundancies, unnecessary qualifiers. (Why say *final termination*?)
2. Don't repeat without a valid reason.

6. Excessive Referencing

1. Keep referencing at a minimum. Use only to indicate source of additional details. State main points in your communication.
2. Reference major communications, available to recipient, only.
3. List references in sequence of use.
4. Identifications of references must be understandable and ACCURATE.

7. Vagueness

1. Be precise. Don't say . . . *from 10 to 20 minutes*. That's a 100% difference and as useful as . . . *a man of 25 or 50*.
2. Avoid ambiguity by using concise words instead of abstract, using examples to illustrate your point, and numbering items so reference to them is unmistakable.
3. Remember these four basic rules of grammar.
   A. Subject and predicate agree, i.e., singular subject, singular verb, and vice versa.
   B. Every time you use *it, these, those, them,* etc., as a pronoun be certain the

word refers only to the *subject* of the previous sentence.

C. Don't dangle modifiers or descriptive phrases. (They often begin with words ending in *-ing*.). The action described must be performed by the subject of the sentence. Don't let the water swell the workman!

D. Don't separate related elements of a sentence; words and thoughts that go together belong together.

4. Remember these four basic points of punctuation.

A. Period — one thought, one sentence — PERIOD!

B. Colon — to introduce a tabulation, enumeration, or long quotation.

C. Semicolon — use instead of *and*, to connect two independent clauses that are closely related and make one sentence of them. Test: A complete sentence on each side of the semicolon. Quotation marks — for direct short quotations; single quotes to set off a word out of context.

D. Comma — use to separate words in a series or two phrases; in place of parentheses.

8. Difficult Style

1. Use established abbreviations. If you *must* (?) coin new ones, explain after first use. No period after abbreviation unless abbreviation forms a word.

2. Write out numbers up to and including nine, except use numerals before percent sign or any unit of measurement; numerals for fractions, decimals, or numerical series.

3. Typewritten copy only! Double spaced, wide margins, paragraphs no longer than six lines.

9. Overuse of Passive Voice

1. An effective balancing is 75% passive verbs, 25% active.

2. Avoid use of *it* or *there* constructions.

10. Poorly Prepared Tables and Illustrations

1. Titles should agree with text.

2. Number consecutively in sequence of use.

3. Arrange items in tables logically; i.e., alphabetically, by model numbers, etc.

4. Check legends on illustrations for spelling, abbreviations, and conformity with the text.

5. No more than three curves on one grid.

6. Identify abscissa and ordinate with logical units.

7. Use glossy 8 x 10 photographs with crop marks indicated.

From PROCEEDINGS, 1970

Teaching an Effective Course in Technical Writing in Private Industry

Max Weber

This paper describes the Argonne National Laboratory course in Technical Report Writing given in the evening, as part of a Laboratory Evening Academic Program (LEAP). This paper discusses the types of people who take this course at Argonne, gives the outline of the course, and describes how the classes are conducted. Some of the things included in the course are a discussion of the process of writing, a description of some basic fundamentals of writing, and some common problems the technical writer can expect to encounter, plus a discussion of diction (as it applies to the way the technical writer selects his words and phrases), punctuation, and style (as it applies to the way the technical writer puts his words, phrases, and sentences together). As an interesting and valuable aspect of the course, it is made as job-oriented as possible by spending classroom time in the discussion of reports various students have written at Argonne.

INTRODUCTION

Some people who do writing or editing as part of their jobs learn practically all they need to know about writing by taking college courses in writing before going to work in their chosen areas. On the other hand, many people (and I feel they represent the majority) really learn about writing after they have been hired to fill a job requiring proficiency in writing. This condition is true with many people who are employed as full-time writers or editors, but it is even more so for engineers, scientists, and technicians who need to be able to present their findings in written form.

Why does such a condition exist to a far greater extent in the writing field than in most other areas? In the first place, there is the problem

of motivation. Students are motivated to write merely because the writing is part of a course that is all too frequently forced upon them as a requirement for a degree. They are anxious to complete their assignments as quickly as possible, so they can get back to their more interesting projects in the laboratory.

In the second place, there is the problem of writing for the reader. In a college course in writing, the instructor is usually the only reader. There therefore is a tendency for the writer to write in a way that will impress the instructor, and not necessarily in a way that will express ideas as clearly and simply as possible. To get his students to enrich their vocabularies, the instructor will encourage the students to use vivid adjectives, to write with dignity, and to use appropriate words. And there is nothing wrong with this, when it is done as part of a program for improving vocabularies. But when writing for an audience that may cover a wide gamut of technical proficiency, the writer must learn to say things as simply and directly as possible, even if it means using the same word over and over again, rather than striving for different ways of saying the same thing.

Some people, also, may have had no courses in technical writing before assuming a position involving technical writing on a full- or part-time basis. In at least one plant of the RCA Service Company, for example, the technical writers are mostly ex-technicians, with no previous writing experience, who had progressed as far as they could as technicians and were promoted to the technical writing area. Whatever training they got in technical writing was through in-house courses given by a senior technical editor.

In any event, technical writing courses given by private industry can frequently be of greater significance and involve more people than comparable courses given by colleges and universities. Many companies have therefore decided to make courses in technical writing available to their employees. This paper describes the course in Technical Report Writing taught at Argonne National Laboratory as part of the Laboratory Evening Academic Program (LEAP), in the hope that this information will help other companies interested in setting up similar courses.

STUDENTS

Before describing the course itself, I would like to say something about the selection of students for the course. Probably the ideal way to present an in-house course in technical writing is to limit each class to people from the same organization or similar organizations. Unfortunately, at Argonne National Laboratory, we have never been able to get enough students from one area together at the same time to make up a class in technical writing.

A recent class, for example, included students from the following diverse areas: Biological and Medical Research, Central Shops, Chemical Engineering, Electronics, High Energy Facilities, Industrial Hygiene & Safety, Liquid Metal Fast Breeder Reactor Program Office, Metallurgy, Plant Engineering, and Reactor Engineering.

In addition, our students cover a wide range of educational backgrounds, including high-school diplomas, Bachelor degrees, Master degrees, and Doctor degrees.

I'm not convinced, however, that the diversity of interests and educational backgrounds has impaired the effectiveness of our course. In an installation as large as ours (Argonne National Laboratory has over 5,000 employees), many people lose touch with what is going on in other parts of the installation. Our course has helped to give the students a better understanding of what the rest of the Laboratory is doing. In addition, the class provides a wonderful opportunity for determining how well people in areas outside that of the author can understand what he has written.

All I can say, then, concerning the background of the students for your course is to evaluate your own situation. Although many people who have taught in-house courses in technical writing

recommend a homogeneous grouping of students; don't be discouraged if you have to accept different types of students; we have done this at Argonne, and the results have been encouraging.

TEACHERS

The best teachers for in-house technical writing courses are usually company employees experienced in technical writing and editing and in teaching. Certainly a company employee would be more familiar than an outsider with the people he is going to teach and with the special requirements of the company in the technical writing area. And since most companies have experienced technical writers and editors, finding at least one of them who has had teaching experience should not present an insurmountable problem.

On the other hand, many companies have made very effective use of outside people to give in-house courses in technical writing. Companies interested in this approach might start by finding out about the three-day course presented by Drs. James W. Souther and Myron White.[1]

At Argonne National Laboratory, I have been the only one to present the course in Technical Report Writing. However, there are enough other experienced technical writers and editors here so that finding another company employee to give the course would not be difficult.

TIME FOR THE COURSE

One decision to be made concerning a technical writing course (or any in-house course, for that matter) involves the time the course will be given. Should the course be given during working hours or on the employee's own time? Presumably, most students prefer to take courses on company time.

Although it is usually easier to get students taking courses on company time than on their own time, there are frequently problems associated with trying to interrupt the work of the teacher and the students to get them together regularly for classes. In addition, there frequently are a number of company employees who will jump at any excuse to get away from their normal work. (People in the Employee Development group at Argonne National Laboratory have found that once they offer a course during working hours, it becomes impossible to give the same course on the students' own time.)

Sometimes the decision as to when to present the course depends upon the nature of the course. For example, if a course can be considered to be an aspect of training rather than education, this would justify an in-hours course instead of an out-of-hours course. As a point of interest, of the courses offered at Argonne National Laboratory, there are about ten times as many out-of-hours courses as in-hours courses.

TEXTBOOKS

Among the fine books available for technical writing courses are: *Technical Reporting* by Ulman and Gould[2], *Modern Technical Writing* by Sherman[3], and *Principles of Technical Writing* by Hays.[4] Another fine book is the *Harbrace College Handbook* by Hodges and Whitten[4] and the associated *Harbrace College Workbook* by Hodges and Laws[5]; Linville uses these in his highly successful course at the Bartlesville Petroleum Research Center in Bartlesville, Oklahoma.

I decided on a more varied approach for our course. For the basic textbook, I selected *A Practical Approach to Technical Writing* by Fife and Carstens.[7] My principal reason for selecting this book was that Fife and Carstens had developed this book from their more than ten years of giving an in-house course in technical writing at Sandia Corporation.[8]

I decided on two other books to supplement the one by Fife and Carstens. The first is Strunk and White's *Elements of Style*[9]; this book, referred to at the Cornell campus many years ago as "the little book," does a beautiful job of giving in brief space the principal requirements of English style; the students find this book to be a delightful way of

improving their writing (technical or otherwise). The second book is *Effective Revenue Writing*,[10] published by the U.S. Government Printing Office; this book presents in concise form a brief, practical review of writing principles, grammar, and punctuation.

In addition to the above three books, I distribute copies of articles and other descriptive matter that are helpful in emphasizing or clarifying various points related to the writing of technical material. I also make frequent reference to Perrin's *Writer's Guide and Index to English*[11] for additional information on some specialized points not covered in the other texts.

DESCRIPTION OF COURSE

General Discussion

Our Technical Report Writing course meets two nights a week for twelve weeks. (Class meetings were two hours long, with a break after the first hour, but have recently been shortened to an hour and a half.)

The first meeting of class is devoted mostly to an explanation of the purpose and organization of the course and a gathering of information about the students. Each member of the class is asked to introduce himself to the others in the class and to tell what his job is, how much writing he does on the job, what kind of things he writes, whom he writes for, and what he thinks his writing problems are.

In addition to providing background information about the students, their answers help me to determine the type of material to include to satisfy the needs of as many of the students as possible. Often the discussion turns into a variety of group therapy and we find out that many writing difficulties stem from supervisors.

During the first meeting of class, I ask each student to bring to class, as soon as possible, copies of something he has written on the job. He is told to bring enough copies for every member of the class so we can use these samples of on-the-job writing for classroom discussion. (As a matter of fact, starting with the second or third meeting of class, about half of each class session is devoted to reviewing the writing done by the students.)

Although I don't insist on it, I suggest that each student limit his writing sample to something that is still in the draft stage and has not been edited by anyone else. This has not always been feasible. In one class, for example, two students each submitted for discussion reprints of articles that they had coauthored and that had been published in technical journals. These articles had been reviewed by at least one editor at the Laboratory and by at least one editor in the technical journal. We were amazed at the amount of improvement we could suggest for both of these articles!

The suggested improvements covered simple grammatical errors (such as lack of agreement of subject and predicate in the same sentence), faulty parallelism, and weak writing style (such as converting verbs into other forms and then finding other verbs to complete the sentence); in addition, some excellent thoughts were developed on rearrangement of material for a more logical presentation.

As is to be expected, in the first few class sessions I do most of the talking during the discussion period. But as the course progresses, more and more editorial changes come from the students, and fewer and fewer from me.

After the first class metting, the plan of the course is as follows:

1. The process of writing
2. The fundamentals of writing
3. Common writing problems
4. Punctuation
5. Diction
6. Style

The Process of Writing

To start the discussion of the process of writing, I point out that the most efficient way of writing a paper or report is to use the three-step approach of (1) preparing to write, (2) writing, and (3) rewriting. In preparing to write, the author first defines his subject so that he knows whom he is writing to, what he is writing about, and why he is writing to this audience on this subject. Then, still as part of the preparation, he assembles his material and outlines it into sections.

The outline, I point out, is particularly important; it gives the author a starting point, provides general framework, and keeps him thinking along logical lines. Although the need for the outline is greater in a long paper than in a short one, even the shortest of papers is easier to write and clearer to read if the author prepares an outline before starting to write.

Once the author has prepared his outline, he is ready for the second step in the process of writing: the actual writing itself. An author who works from his outline (and remembers that the third step in the process of writing is rewriting) should find the second step to be the easiest of the three steps.

The best thing for the author to do is to get his first draft on paper as quickly as possible. He might even try dictating his first draft, if he is aware that dictation, like other skills, requires practice. When dictating, the author must remember not only to work from his outline but also to plan to know where each sentence will end before he begins it. Many an author who tries dictating his first draft finds that he spends so much extra time rewriting the transcript of what he has dictated that he relies on only written drafts from then on.

The final step in writing (rewriting) is the one in which the author tries to do an effective job of polishing his draft. First he reviews his writing for such things as completeness, unity, coherence, and emphasis. Next he reviews his draft to see if he has used his paragraphs, sentences, and words most effectively. Finally, he reviews his draft for style and mechanics; here he is concerned with such things as consistency in capitalization, orthodoxy in spelling, and conventionality in grammar.

The Fundamentals of Writing

The second part of the course (the fundamentals of writing) starts with a discussion of the word as the unit of meaning. Here the student is reminded that although there are seven parts of speech (excluding interjections), everything in a sentence performs any one of four functions: naming, designating action, modifying (or limiting), or connecting. Following the discussion of words, we discuss groups of words, in the following sequence: sentences, clauses, phrases, and idioms.

Common Writing Problems

The third part of the course (common writing problems) starts with a discussion of word order. Here we stress the fact that the locations of elements of sentences determine their functions. The writer needs to be particularly careful that he has not so placed words in his sentences that more than one interpretation of the meaning is possible.

Following the discussion of word order, we cover other writing problems, such as pronoun reference, the passive voice, dangling modifiers, and parallelism.

In the discussion of pronouns, we emphasize that the reference must be clear to the reader and that the writer must not use the same pronoun to mean more than one thing in the same passage. In the discussion of the passive voice, we stress the importance of the writer using it only when he has a valid reason for doing so. In the discussion of dangling modifiers, we point out the good writer (technical or otherwise) avoids them, not just because they are incorrect grammatically but *simply because educated readers do not expect to find them* (as Perrin says in his *Writer's Guide and Index to English*).

Finally, we explain that an outstanding difference between effective and ineffective writing

is the way the writer handles parallelism of sentence elements; the effective writer expresses ideas of equal importance in similar structural elements.

PUNCTUATION

The fourth part of the course (punctuation) reviews the various punctuation marks, with emphasis on areas that are peculiar to technical writing. We point out, for example, that whereas the dictionary shows periods after all abbreviations, common practice in technical writing is to use periods only with abbreviations that form other words (such as *in.* for *inch*.).

We devote quite a bit of time to the comma because it serves more functions than any other punctuation mark. We stress the need of consistency in using a comma before the word *and* in a series of three or more items. Also, the effective technical writer almost always uses a comma to set off a modifying element at the beginning of a sentence. (In nontechnical writing, this practice is usually restricted to long modifying elements.)

We try to discourage overuse of the dash, for two reasons. First of all, overusing dashes in writing does not let them do their job effectively when they are needed. Second (and for some people this is the more important reason), most typewriters do not have dashes; therefore the typist must use two hyphens for a dash, and the writer must be even more careful than usual in proofreading his typewritten manuscripts to detect every mistaken use of the single hyphen for the dash.

Concerning quotation marks, we advocate consistent usage of the American style; this means putting the comma and periods before closing quotation marks (whether they belong with the quotation or not), putting the semicolon after the closing quotation marks if it belongs with the quotation.

Diction

The fifth part of the course (diction) concerns the choice of words and phrases by a writer (or speaker) to convey his meaning efficiently, accurately, and unambiguously. We start by advocating the use of the simpler, more familiar word for the longer, less familiar one; the shorter word for the longer one; and the concrete word for the abstract word.

Next, we stress the elimination of 'deadwood' words or phrases that do not peform useful functions. Then we discuss jargon, the specialized language of a trade, industry, profession, or other group. A writer must tailor his writing according to his audience. He might use jargon if he knows he is writing for a group of his peers, but he must translate it into ordinary English if he is writing something to be read by a general audience.

Next, we cover clichés, expressions that have been worn thin with overuse. Clichés may not be noticeable in speaking, but they tend to become trite and tiresome and should be avoided in writing.

Then we discuss "verb mutilation." Here we point out the weakness in writing that converts the verb into some other form so that the writer uses it as the subject, the object, or a modifier, and then must find an artificial verb to complete the sentence.

Finally, we briefly cover the importance of having a good vocabulary. The writer with the rich vocabulary has a wider choice of words than the writer with the meager vocabulary and is therefore more apt to find the word with the precise meaning, tone, connotation, and level needed for his purpose.

Style

The sixth (and final) part of the course (style) helps the writer to recognize the nature of style. Once he realizes that writing style can be changed, he can try to devlop a style that suits his writing needs. As the first element in the discussion of

style, we have the student consider structure and thought. This means he must learn to focus on his main ideas by balancing structure with content and purpose, by placing his main ideas in strong positions, and by making sure that the relationships among his ideas are clearly expressed.

As the second element in the discussion of style, we cover space considerations. Here we cover the problems involved in changing the length of what he has written for some reason or other; perhaps he must shorten something to fit into the available space, or perhaps he must expand it to fill the space.

Shortening the writing involves such things as reducing sentences to clauses, clauses to phrases, and phrases to words, as well as eliminating words that add little to the meaning. Expanding the writing can also present a problem, for example, when the writer wants to keep a communication from being so short that it appears to be rude or offensive.

The third element covered in the discussion of style is position. Here we stress the importance of properly emphasizing main ideas by placing them in strong positions. Starting with the sentence, we point out that, generally, the end of the sentence is the strongest position, the beginning is the next strongest, and things in-between are the weakest. Also, periodic sentences are usually more effective than loose sentences.

The writer must also be sure to use strong positions for key ideas at the paragraph, section, and chapter levels. He also has to be careful to avoid piling up modifiers in front of a noun, since this practice frequently results in unnatural constructions that are hard to interpret properly.

The fourth (and usually final) element in the discussion of style is the relationship of ideas. The writer must learn to plan his writings so that the reader is immediately aware of how the ideas are related to each other. The effective writer ties his thoughts together with such devices as meaningful transitional words and phrases, clear pronoun reference, repetition of key words and phrases, and parallel structure. A human engineer must build his machines around the man who is to operate them; so, too, must the technical writer build his reports, manuals, or other publications around the man who is to read them.

SPECIAL FEATURES OF COURSE

I would like to mention a few special features which we include in our course and which may also be applicable to other technical writing courses in private industry.

I have already mentioned the practice of using half the time in class analyzing and discussing reports written by the students (preferably recently). Most students quickly become proficient at sentence analysis and fall into the habit of using the technique of analysis in working on awkward or unclear sentences. Many students seem to feel that this is not only the most interesting but also the most informative part of the course.

Because of the varied backgrounds of the students, and because of the difficulty in preparing and grading really worthwhile written assignments, I do not assign any writing to be done as homework. However, many of the students need a more detailed review of writing principles, grammar, and punctuation than can be provided during regular class time. This is where I use *Effective Revenue Writing 1*,[10] mentioned earlier in this paper.

I have obtained a copy of the workbook for use with this text, and from this workbook I have devised a series of 22 multiple-choice tests, each of which is assigned as homework. The first few minutes of each class are devoted to a discussion of the test assigned during the previous class. The amount of time spent discussing each test is varied in accordance with the number of questions raised by the students. Even my best students found (sometimes to their surprise) that they learned quite a bit from this part of the course.

Another special feature of our course concerns the use of Strunk and White's *Elements of Style.*[9] Mostly, it's a matter of selecting points in this book that are particularly appropriate to technical writing and using them for class discussion. In addition, I select some points that appear to apply mostly to nontechnical writing and show that they are equally valid in technical writing.

One such point, for example, is "Choose a suitable design and hold to it." Once the student realizes that this principle, applied to technical writing, means to prepare an outline and work from it, his writing cannot help but be improved immeasurably.

The final special feature I would like to mention is perhaps the most significant one. The course in Technical Report Writing is taught in alternate semesters with a course in Effective Speaking. Both courses are taught by the same instructor and presented so that one course complements the other. In a paper I presented at the Fifteenth International Technical Communications Conference,[12] I discussed in some detail the concept of teaching technical writing and effective speaking as complementary subjects.

CONCLUSION

I have described here the twelve-week course in Technical Report Writing, as it is taught at Argonne National Laboartory. The course may not make polished writers out of its students, but it does make them aware of the most common writing errors and the things that can be done to eliminate these errors.

Perhaps even more important than the recognition of writing errors is the realization the students derive from the course that the process of writing consists of, first, preparing to write, second, writing, and third, rewriting (as discussed in *A Practical Approach to Writing*).

The student learns that preparing to write is the most important step he takes in the writing process. Here he thinks out what he is going to write, limits his subject, determines his audience, defines his objective, and designs his plan of attack. If the writer prepares properly, and if he remembers to allow for rewriting, the actual writing of his first draft is the easiest of the three steps. Finally, the student learns that careful rewriting can make the difference between a rough, amateurish piece of writing and a polished, professional one.

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From PROCEEDINGS, 1960

Industrial Training of Technical Writers

Ralph M. Cummings

Training technical writers to report and interpret the technological developments of our times — to meet the challenge of the "information explosion" and to close the "communication gap" — is one of the major problems faced by the technical publications industry today. My topic is the post-employment, on-the-job training that can and must be provided by industry. More specifically, I am going to talk about the broad program that Chrysler Corporation Missile Division has developed for technical writers and editors.

We consider this matter of training writers and editors to consist of three phases: first, the training of inexperienced, apprentice writers; second, the indoctrination of newly hired, experienced writers; and third, the supplemental or "refresher" training needed by experienced writers who have been with us for some time. First: the kind of writing our writers do and the qualifications we look for in a technical writer.

WRITING CATEGORIES

At Chrysler Corporation Missile Division our technical and semi-technical writing requirements fall into four categories: (1) reports; (2) technical proposals; (3) special publications such as engineering specifications, speeches, brochures, film scripts, and other management communications; and (4) technical manuals. However, the writing of technical manuals constitutes the greater part of our activities.

Technical manuals are an essential part of a weapons system and are just as much a component of a missile as the nose cone. Without manuals "the bird cannot fly." In the weapons system concept, the hardware and the men who operate and maintain it are inseparable. These men must be given accurate, reliable, up-to-date information on the operation and maintenance of each component of the entire system. Our manuals provide this information. They must be as accurate and reliable as the weapons system they support.

We are constantly attempting to improve the presentation of the complex technical information contained in these manuals. We are always looking for new communication techniques. One of the newer techniques we are using, and one with

which many of you are undoubtedly familiar, is the picture-book type of presentation. This method of presenting technical information is becoming increasingly popular within industry and the Armed Services.

As an example of the picture-book technique as we use it, visualize a technical manual covering the operation and maintenance of a component of a missile system; for instance, a vehicle for fueling the missile. This manual contains a pictorial description of the vehicle and its major components. Continuity is provided mostly by figure captions with very little text. Operating instructions are handled similarly, with close-up views of an operator's hand turning a valve, pushing a button, attaching a hose, and so forth, all in a logical, step-by-step sequence — much like the individual frames of a motion picture film. Step-by-step preventive maintenance and repair procedures, too, are illustrated and further supplemented by exploded views of subassemblies and individual parts.

At first it would seem that the use of the picture-book technique would simplify the writer's job. But we have found that it does not. Rather, it increases our need for highly skilled, technically competent writers. Our chief problem in staffing, therefore, is recruiting and training qualified manuals writers, writers who can serve as the communications link between the man who designs the weapons system and the man who operates and maintains the system.

WRITER QUALIFICATIONS

What then are the qualifications we look for? We believe the ideal manuals writer must possess many qualifications. He must be a skillful writer with a taste for facts and the gift of simplicity. He must be able to use words effectively, particularly when developing a manual according to the picture-book concept. In such a manual, each word, each sentence, must count. There is no room for fuzziness, wordiness, or faulty organization. Because of the need for simplicity, clarity, and conciseness, technical writing of this type is frequently the most difficult kind of writing and often requires strict mental discipline.

The ideal manuals writer should have a strong technical background. He must be able to build a manual from drawings and a parts list. This is especially true of the writer of manuals covering the operation and maintenance of highly complex electrical and electronic components such as test fixtures, gyros, servo-mechanisms, and "black boxes." He must be able to understand and interpret for his reader the technical knowledge of the engineer.

In planning his book he must be able to visualize from the outset the kind and number of illustrations he will need and guide the photographers and artists who work with him accordingly.

He must know something about copy preparation and printing, production control and scheduling. He must be able to work with and interpret military specifications. He must be able to work well with people — engineers, fabricators, technicians, artists, and photographers, as well as his fellow writers. And he must have the mental flexibility to accept new concepts, new techniques, new ways of doing his job. In our organization we call this writer a "rare breed of cat."

Because this breed of cat — the qualified manuals writer — is so rare and because the demand for his services is constantly increasing, we have developed a formal program for training inexperienced, apprentice writers to help us cope with our own "information explosion."

TRAINING PROGRAM FOR WRITERS

Our program has been in operation approximately one year. Two groups of trainees have graduated from it to date. This program has three objectives:

1. To provide at the lowest possible cost a group of technically competent writers, Chrysler-trained and oriented to the specifications to which our manuals are written, writers thoroughly trained in the principles of effective technical writing and efficient book publishing.

2. To take advantage of the technical "know how" available in the Detroit area.

3. To free our supervisors and senior writers from some of the routine tasks connected with the writing of manuals.

Although the program is designed for manuals writers, we are confident that a graduate of this program is well prepared to do many other kinds of technical writing.

This six-month training program is divided into two major parts. The first part consists of seventeen weeks of classroom training, including workshops in which the trainees actually write simple manuals to the military specifications. The second part is made up of nine weeks of closely supervised on-the-job training.

The curriculum covers three broad areas: (1) orientation courses consisting of Corporation history, operating policies, blueprint reading, and introduction to ballistic missile theory; (2) systems engineering and analysis; and (3) writing, editing, interpretation of military specifications, use of technical information services and illustration and publishing techniques. All three areas of the curriculum include subjects related to electrical and electronic systems and mechanical systems.

Instructors for the program are drawn from three Missile Division activities: the Education and Training Department, the Field Support Branch, and Publications Branch. Each subject is taught by an expert in that particular field and, wherever possible, by an expert who has had some teaching experience.

REQUIREMENTS FOR TRAINEES

In recruiting and screening candidates for the program, our recruiting and placement departments look for prospective trainees who can meet the following requirements:

1. A demonstrated ability to learn, as evidenced by high academic records.

2. A minimum of three years of mechanical or electrical engineering, graduation from a recognized technical trade school, or a degree in English or journalism.

3. Acceptable performance on a battery of seven intelligence and aptitude tests.

Throughout the program, the progress and performance of each trainee is evaluated frequently. As in any academic program, the trainees must maintain a certain grade average to remain in the program. During the on-the-job training period, at least two formal performance evaluations are made. Upon successful completion of the 26-week training period, the trainee may be reclassified as a Technical Writer B, he may be reclassified as an Engineering Aide, or he may remain as a trainee for as long as six months. In all three instances, he receives a salary increase. If he is not qualified for reclassification at the end of the second six months, he is terminated or reassigned.

EVALUATION OF PROGRAM

I believe that the results have been encouraging. The trainees have indicated a high degree of interest in their work, their work habits appear to be good, and on the whole they have been able to perform their duties satisfactorily.

We have found and remedied some deficiencies in the curriculum. After the first offering of the program, we expanded the courses in English grammar and composition, and those covering the use of military specifications. We have also added courses in transistors and magnetic

amplifiers to strengthen the technical side of the program.

In analyzing the performance of the instructors, we have become firmly convinced that the engineering, technical writing and editing, and specifications courses must be taught by persons who are experts in these fields.

We consider the duration of the entire training program to be a minimum of one year, although the formal program extends for only six months. No matter how well a trainee has mastered his lessons during the six-month training period, rarely could we consider him to be a full-fledged technical writer at the end of those first six months. The trainee's performance during the second six-month period is evaluated frequently. Although he is given increasingly difficult assignments as his progress warrants, he continues his work under the watchful guidance of more experienced writers.

PLANNING CONSIDERATIONS

Generally speaking, we have been satisfied with the results to date, but instead of closing this presentation on a note of high optimism for the success of our program, I would rather offer some recommendations to be considered in the planning of such a program.

1. **Instructors**

   Select instructors who understand and who can interpret the communications aspect of technical writing — instructors who are good communicators themselves. Any lack of formal teaching experience can be overcome by the assistance of professional industrial education and training personnel and by the instructor's enthusiasm for his subject.

2. **Curriculum**

   Provide extensive reviews of the fundamentals of English grammar, punctuation, spelling, and composition. Support these basic courses with others in the use of composition techniques with emphasis on descriptions, procedures, and instructions. Provide also adequate workshop periods. It is imperative that the trainee have an opportunity to apply and test information soon after he has obtained it in the classroom.

3. **Training a Continuing Process**

   Consider the scope of a training program to be broader than the initial training of apprentice writers. Rather, consider a training program to consist of three parts:

   - The first part is the training of the apprentice writer who will be able to perform acceptably, after a relatively short period of intensive training, under the guidance of experienced writers.
   - The second part is the indoctrinating of the newly hired, experienced writer to the job requirements and concepts of his new employer.
   - The third part, and possibly the most important from a management viewpoint, is supplemental and "refresher" training of long-time employees. Even experienced writers must be formally coached to assure continued improvement, and to assure that they will be able to change concepts, and adapt to new situations as the customer and the customer's requirements change.

Post-employment, on-the-job training of skilled and unskilled workers is not new to industry as a whole, but the formal on-the-job training I have discussed is a relatively new development in the publications field. This kind of training cannot be regarded, however, as a substitute for the broad educational process started intially by the family and school, stimulated further by the college or university, and continued throughout life by the individual. Industrial training is just an aid to professional development, which ultimately must be motivated by the individual himself.

From PROCEEDINGS, 1973

An Advanced In-House Course in Technical Writing

Max Weber

This paper describes the Argonne National Laboratory course in Advanced Technical Writing, taught as part of the Laboratory Evening Academic Program. Among the things included in the paper are the types of people who take the course, a description of the course itself, and a discussion of how the classes are conducted. The course covers the nature of written communications, sentence deficiencies, grammar, semantics, syntax, economy in writing, modifiers, parallelism, linkage, logic, and style. The course is designed to be job-oriented by devoting classroom time to discussing reports the students have written as part of their Laboratory responsibilities. To help develop the students' ability to analyze writing, each student takes a turn at leading the discussion of writing done by another student.

Many companies offer courses in technical writing to their employees who are required to do writing or editing as part of their work. Papers describing in-house courses in technical writing have been presented at various Conferences. Some typical papers are the ones by Tichy,* Mazzatenta,[1] Fife,* Sisk,* and Linville.*

At Argonne National Laboratory, in addition to the preliminary course in technical writing (the course is actually called Technical Report Writing), I have also been teaching a course in Advanced Technical Writing (strangely enough at the request of employees who had completed the course in Technical Report Writing).

This paper describes this advanced course, which is taught at Argonne National Laboratory, usually as part of our Laboratory Evening Academic Program (LEAP).

*included herein.

STUDENTS

Before describing the course itself, I would like to say something about selecting students for the course. Probably the ideal way to pick students to take an in-house course in technical writing is to limit each class to people from the same organization or similar organizations. Unfortunately, at Argonne National Laboratory, we have never been able to get enough interested students from any one discipline to form a class in technical writing. So each class has included students from various divisions and with various educational backgrounds. However, neither the diversity in educational background nor the variety in technical areas seems to have lessened the effectiveness of our writing courses. The variety has helped the students understand what the rest of the Laboratory is doing and has given them a chance to see how well people in other areas can understand each other's writing.

TEXTBOOK

Obviously, the selection of the textbook for the advanced course would have to be related to what was used in the elementary course. As I mentioned in my 1970 paper, we use *A Practical Approach to Writing*,[3] by Fife and Carstens, as the basic textbook in the elementary course and supplement this with *Effective Revenue Writing 1*[4] and Strunk and White's *Elements of Style*.[5] In the advanced course, I use some material from the above three books, but build on this with material from *Effective Revenue Writing 2*.[6]

GENERAL DISCUSSION OF COURSE

Our Advanced Technical Writing course is a nine-week course of two two-hour sessions each week. Depending upon the interest and the time available for both the instructor and the students, the course is presented in the evenings or during working hours.

Basically, the classes in the advanced course follow the same pattern as those in the elementary course. The first hour of each two-hour session is devoted to a theoretical discussion of various writing problems. The second hour is devoted to a discussion of samples of technical writing done by the students as part of their work.

Perhaps the principal difference between the elementary course and the advanced course is the approach to the writing situation. The elementary course lays the foundation for effective technical writing; the advanced course builds, on that foundation, the structure of effective writing. To put this in another way, the elementary course tells the writer what to do; the advanced course helps him understand why certain principles are important and teaches him how to apply these principles.

Another difference between the elementary and advanced courses is the method of handling the textbook portions of the courses. In the elementary course, most of the text is covered by lecture and discussion in class. In the advanced course, the students are expected to dig most of the material out of the textbook by themselves. To be sure the material is covered adequately, I assign tests for various portions of the material, and then discuss answers provided by various students to determine the most appropriate answers.

In the elementary course, the tests assigned as homework consist of fairly simple multiple-choice questions, such as:

> In this group of sentences, which sentence illustrates an unnecessary shift in mood or voice?
>
> 1. It is requested that a record be kept of the proceedings, that a report be prepared, and that copies be sent to all participants.
>
> 2. Please keep a record of the proceedings, prepare a report, and send copies to all participants.

3. It is requested that you keep a record of the proceedings, that you prepare a report, and that you send copies to all participants.

4. You are requested to keep a record of the proceedings, and then a report should be prepared and copies sent to all participants.

In the advanced course, although there is some element of choice involved in the homework tests, part of the assignment consists of rewriting sentences to eliminate weaknesses in writing. A typical question would be something like this:

> The following sentence contains a flaw in modification. Your assignment is twofold: (1) diagnose the flaw, and (2) write an improved version of the sentence. In your diagnosis you may find it helpful to underline the faulty part of the sentence. The following list of flaws may help you make a more exact diagnosis. Do not feel you must use only the terms in this list if you wish to use other or additional terms to describe the errors.
>
> Squinting modifier
>
> Dangling modifier
>
> Misplaced modifier
>
> Abrupt modifier
>
> Absolute construction not logically tied to main thought of the sentence
>
> Illogical separation of modifiers
>
> "Although the proposed type of organization corrects this problem at the branch level, it creates a new problem of the same type for the division chief, although many see it as the only feasible solution."

As with the elementary course, the advanced course is job-oriented by having each student provide (for classroom discussion) copies of something he wrote as part of his work. A significant departure, as compared to the elementary course, is that a student, rather than the instructor, leads the discussion of another student's written material. The practice each student gets in analyzing someone else's writing helps him to learn how to diagnose and improve his own writing.

THEORETICAL MATERIAL COVERED IN CLASS

The paragraphs below summarize the theoretical items covered in the classroom discussions:

Nature of Written Communication

Since direct thought transference is not possible, we are forced to use the next best thing, writing, as a substitute for thought transference. And, since the sentence is the only basic tool we possess, we must clearly understand its nature.

The first rank of units within a sentence includes the subject and predicate. Any vagueness about the subject or ambiguity about the action portrayed by the predicate complicates the job of the reader in understanding the statement being made.

The second rank of units within the sentences includes the modifiers of the subject and the verb (adjectives, adverbs, phrases, etc.) The careful writer does not let these modifiers become so numerous and complicated that the subject and verb are obscured. He keeps his modifiers simple and parallel and places them close to the words they modify to enhance the meaning of his sentences. He is especially careful with clause modifiers, which have their own subjects and predicates. When such modifiers become too numerous, they tend to obscure the meaning of the main clause in the sentence.

The lowest rank of units within the sentence includes things such as conjunctions, prepositions, and conjunctive adverbs. These are less likely to

cause trouble than other parts of sentences if they are properly operated in accordance with the rules of grammar. One of the things I caution my students about, concerning these sentence elements, is to avoid using swollen forms such as *with reference to, due to the fact that,* and *subsequent to* instead of *about, because,* and *after.*

Another thing I cover in this discussion of the nature of written communications is a comparison between spoken and written sentences. Certainly, if we apply the spoken style to our written communication, we will have a direct and natural flow to our writing. On the other hand, we must be careful not to carry this too far or our writing produces a great deal of inexactness, wordiness, poor organization, sloppy syntax, and repetitiveness. The writer must remember that some spoken expressions are effective only when they are supplemented by gestures, facial expressions, and appropriate voice modulation.

Sentence Deficiencies

Mechanical attempts to diagnose sentence deficiencies have limited usefulness. For example, we cannot mechanically condemn long sentences. A long sentence is good if context justifies it, if style approves it, and if the idea fits it. What we must really strive for is freedom within form. The writer should let his writing exhibit his own personality, but he must be sure to comply with all the rules of writing.

The most common "diseases" that produce sentence deficiencies can be categorized as weak writing, obscurity, confusion, incorrectness, and unattractiveness.

The causes of weak writing are jargon, loose syntactical structure, and nonlogic. Jargon (defined for our purpose as any method of writing that weakens or conceals the subject or verb of a sentence) results from such things as substituting a false subject for the real one, expressing the subject abstractly and vaguely, and using weak verbs of relationship instead of strong verbs of action. Loose syntactical structure can result from such things as poor parallelism and the use of loose sentences rather than periodic sentences for emphasis. Nonlogic refers to a lack of logical tightness throughout a piece of writing; some of the most common symptoms of nonlogic are a failure to show the relationships between ideas (for example, inadequate use of links such as *in addition, moreover, however,* and *indeed*), a failure to make full use of organizational units (such as section headings, paragraph indentations, transitional paragraphs, and numbered lists), and a failure to avoid ambiguity (by constructing sentences so that various interpretations are possible, or by including in a sentence ideas that have no logical relationship).

Obscurity in writing is a localized problem, usually easy to detect and cure, because the sentence in question seems to say nothing or to say something the writer obviously did not mean to say. The most common causes of obscurity are misplaced modifiers, great separation between the subject and the verb, sentences that try to say too much (that is, sentences that are not well built and do not truly express one unified thought), and poor vocabulary (either the use of incorrect words or the use of perfectly correct but little-known words.)

Confusion in writing refers to defects that fail to give the reader a clear sense of the total meaning and relevance of that piece of writing. The most common causes of confusion in writing are (1) the failure to aim the writing toward a specific purpose, (2) the failure to anticipate the needs of the reader, (3) writing before organizing, and (4) writing from less than a full knowledge of the subject.

Incorrectness creeps into our technical writing when we are careless about observing the rules governing correct writing. Anyone who writes should be sure to include among his books a book of grammar and an up-to-date dictionary.

Unattractiveness in writing results from a lack of awareness that the overall effect of a piece of

writing can be more important than its specific thoughts. The writer therefore needs to be concerned with style. The truly effective technical writer learns to develop a pleasing style, usually through much reading of good writers. He develops a style of his own and a sense of the power of personality in technical writing.

Grammar

I review punctuation by reminding the students that punctuation serves three main purposes: it separates, it groups and encloses, and it emphasizes.

The writer has different ways in which to separate statement units. He can separate independent clauses with a coordinating junction (and usually a comma as well); or he can separate them with a semicolon; or he can achieve greatest emphasis and separate the clauses with a period. For an effective compartmentation of logical units, he can use flexible separation punctuation. For example, he can use commas between little units and semicolons between big units. Or he can use letters or numerals within a sentence. Or he can list parallel items in a column. The students need to be reminded that the most important separation punctuation is the paragraphs. The careful writer consistently means it when he uses a paragraph.

The most common punctuation mark for grouping and enclosing is the comma (used in pairs). I remind the students of the common omission of the required second comma in a pair; this is an error in logic in that the single comma separates, although the writer really wanted to group and enclose. The writer needs to be particularly careful to use a comma pair with a nonrestrictive modifier, but no comma with a restrictive modifier. Similar care must be used in handling appositional construction or in giving instances.

Perhaps the most common ways to emphasize a word or idea are to underline, capitalize, indent, or use exclamation marks. Two other means of emphasis, involving punctuation, are to place sentence elements out of their normal order and to interpolate emphatic phrases within commas.

Our coverage of grammar is limited to a discussion of the types of grammar errors that most frequently diminish sentence effectiveness, primarily those that affect the meaning of the sentence. The first type of these errors involves errors that obscure subject-verb relationships. The careful writer uses only nouns, pronouns, gerunds, infinitives, and noun clauses as subjects. When a sentence starts with an explative, he makes sure that the true subject is something that can grammatically function as a subject. And he remembers that a linking sentence is sound only if the subject and the predicate complement are identical in logic.

The second type of error involves errors that obscure parallel relationships. When the careful writer uses coordinating conjunctions, they connect sentence elements of exactly parallel structure and weight. Similarly, thoughts written in parallel form must be parallel in importance. And the coordinating conjunction *but* must connect ideas that are divergent but logically balanced.

The third type of grammar error covered involves errors in the use of verbals. The students need to be reminded that, although a verbal functions as a noun, an adjective, or an adverb, it still maintains some of the characteristics of a verb and can cause problems if not treated carefully.

The final type of grammar error covered involves errors in the logic of tense. Common errors occur when the writer is not careful to distinguish between momentary and elongated actions. A sentence containing both types of action requires special care. Special care is also required in mixing verbals and verbs.

Semantics

The careful writer uses specific words to express specific meanings. He uses general words

only when he wants to include every meaning such words can embrace. Usually, the specific word or phrase is shorter than the general, vague one, so if we are specific whenever possible, we also achieve economy in our writing.

The next item covered under semantics involves nonstatements. Some writers excel in producing grammatically complete units that say nothing. Or they destroy the force of a direct statement by including a nonstatement modifier. Careful writers know that the bulk of nonstatements are made because the jargon producing them has become almost the standard style in technical writing. Careful writers therefore use the direct, natural way of making statements whenever possible.

Next we cover inflated words, words that give the impression of saying more than they do. The careful writer keeps a sharp eye out for words that connote anything formal, official, or ritualistic. He avoids using longer, less common words when simpler words meaning the same thing are available.

Then we discuss connotation and denotation. The careful writer distinguishes between the actual meaning of a word and the meaning that word suggests. Concrete words have the advantage of exactness of identification and should, as far as possible, compose the bulk of words used in technical writing. If an abstract thought is to be communicated, the careful writer still tries to find the exact, simplest word to express this thought with physical directness.

Syntax

Speech consists largely of loose sentences that express their main ideas first and leave modifiers and other secondary elements for last. Writing makes great use of periodic sentences that save their main statements for the end.

One problem with loose sentences is their tendency to dwindle or peter out. They are also subject to ambiguity caused by misplaced modifiers. In addition, they often fail to show exact logical relationships and tend to become monotonous. The careful writer uses loose sentences where appropriate, but is careful to provide variety in his writing by mixing periodic sentences with loose sentences.

Periodic sentences are more emphatic than loose ones, more adapted to a tight, logical pattern of thought, and more effective in presenting an argument. But they convey a tone of artificiality and complexity when too many of them are used together. If the subject-verb relationship is postponed too long, the meaning becomes obscure. And since they involve complicated constructions, they sometimes go awry in grammar, particularly in parallelism.

The students are encouraged in the use of *head-on* sentences, sentences in which there is a direct relationship between the subject and verb, and in which the real subject and the real verb of statement occupy their proper positions. The substantive that serves as the subject of the sentence should be the thing the sentence is about, the thing doing the action. The verb should be the most active verb the writer can find, and he must use it where it will do the most good. He avoids jargon, since jargon smothers the action the verb is meant to convey.

Economy in Writing

The purpose of writing is to meet the needs of the reader, and the reader's mind needs brevity, clear, logical relationship, and wholeness. The careful writer avoids being blunt, however. He cuts down without cutting out.

One way to economize is to reduce the syntactical weight of the writing. If a clause modifier is not needed to clarify or emphasize, reduce the clause to a phrase or an adjective. Or, if the clause modifier cannot be reduced to a phrase or adjective, try omitting the subject of the clause.

A second way to economize is to avoid padding and roundabout phrases. Jargon has resulted in the invention of numerous stock phrases that use many words to say a one-word thing. And jargon has produced parasite words that add nothing to the meaning of the words they live on. Although it is sometimes appropriate to add extra words to get greater emphasis, the careful writer avoids useless, extra words.

A third way to economize is to avoid the passive voice. Not only does the passive voice conceal the doer of the action, but it also uses more words than the active voice. The careful writer uses the active voice as much as possible.

Another way to economize is to avoid static phrases, word groups that express a condition of being instead of an action. The careful writer avoids expressions like *such as to, is applicable to,* and *is directly concerned with.* He also avoids double negatives and tries to use participles or infinitives, rather than longer noun phrases.

Still another way to economize is to combine the ideas of several sentences into one. Although the careful writer avoids long, rambling, loose sentences, he has mastered the technique of constructing sentences that say many things, say them well, and say them with all logical relationships expressed.

Modifiers

Although adjectives may be bewildering in some ways, they are easier to handle than adverbs. Adverbs have a tendency to wander so that they appear to modify words other than the ones they are intended to modify. Samples of adverbs that are particularly troublesome in this respect are *only, merely, almost, nearly, scarcely,* and *largely.*

Some adverbs are hard to identify in that their force is not clearly adverbial. Generally, when they modify the sense of an entire sentence, they come first or last. When they are put close to a word in a sentence, they more sharply aim their modification. Writers must be careful in the placement of words like *nevertheless, therefore,* and *consequently* and particularly careful in the placement of *however.*

The movability of adverbial modifiers is a source of sentence flexibility, and this mobility is true of all adverbial modifiers: adverbial prepositional phrases, adverbial clauses, appositive units, absolutes, and *with* constructions. The writer must be careful that his adverbial modifiers do not dangle or do not produce nonsensical statements.

Squinting modifiers are a source of trouble to the careless writer. Every writer must be careful to avoid modifiers so placed that they can be interpreted as modifying either preceding or following words.

The modification of infinitives also poses a problem. Some people object to split infinitives. But good writers do not hesitate to split their infinitives if sense demands it or if it improves style.

The careful writer is aware of the need for balance in the use of modifiers. He typically places most of his modifiers within the sentence structure and does not permit them to dangle at the beginning or the end. On the other hand, he avoids cluttered, stumbling sentences. His goal is a preponderance of loose, swift-running forms, interspersed with structures that slow the motion, pack the ideas in, and give a sense of emphasis.

We are sometimes inclined to put too many modifiers between the subject and the verb. The careful writer remembers that meaning is often obscured when subject and verb are too widely separated. (The same principle applies, though on a smaller scale, with the separation of verb and object.)

Absolute construction is useful in technical writing, where modification and predication can be abundant but subjects are usually in short supply. Absolute construction permits the writer to add predicates without adding too heavily to sentence weight. Such construction should always be

checked to be sure it expresses a thought logically tied to the main thought of the sentence.

Finally, the careful writer avoids separating related modifiers. He keeps related modifiers pulling together in parallelism so that modifiers that logically belong to the same idea appear side by side.

Parallelism

One of the most common constructions that demands parallelism is the coordinate conjunction. By its nature, the coordinate conjunction must unite elements that are parallel in grammar, syntax, logic, and position. Although any gross unbalance in a sentence can usually be easily detected, the careful writer notes exactly what is joined by every coordinate conjunction he uses. He always remembers that the act of coordinating demands strict logical justification and careful grammar and syntax.

Linking verbs require exact equality between the units they join. They should not join a nominative case subject to an objective-case predicate noun. Most violations of linking-verb parallelism involve logic, rather than grammar.

Correlative conjunctions, used in pairs to connect coordinate sentence elements, can be a source of improper parallelism. The careful writer knows that the first part of the correlative conjunction is a promise to be fulfilled; the idea that follows it must be matched with another idea, equivalent in logic, grammar, and syntax, immediately after the second part of the correlative conjunction.

The careful writer avoids *The reason ... is because* sentences. He remembers that *reason* is a substantive; it does not mix on equal terms with a *because* clause.

Rather than is another expression that requires parallelism. This usually presents no problem in short, simple sentences. In long sentences, one must be sure that what follows *rather than* is parallel, in grammar and logic, to what it refers back to.

The careful writer handles *and which* constructions properly. He checks every coordinate conjunction appearing before *which (or who)* to make sure there is a preceding which-clause (or who-clause).

The order in which parallel elements should be expressed is determined by logic and rhetorical effect. When appropriate, the order will be determined by a logical progression, a time sequence, or a sequence of climactic development. Otherwise, sentence smoothness should decide the issue.

Linkage

Linkage is inseparable from good organization. The most useful links are the coordinate (or coordinating) conjunctions. These conjunctions (*and, or, for, but, yet, nor)* must not be used to fasten together things that are not coordinate. From the point of view of linkage, the thing to be said about coordinating conjunctions is not that they are susceptible to a variety of errors, but that they are often put to tasks they are not equipped to perform.

Conjunctive adverbs (sometimes called transitional or illative adverbs) are primarily concerned with modifying and supporting the action of a sentence, but they also perform the task of showing how one thought relates to another. Some writers overuse conjunctive adverbs; other writers hardly use them at all. The careful writer uses conjunctive adverbs to show the relationship between ideas when the relationship is not self-evident.

Lengthy reports frequently require more elaborate links than single words or simple phrases. Careful writers use entire sentences to tell the reader where he is and what he may expect next.

The writer must not expect the impossible of linkage; it cannot itself provide for unity or progress. Every piece of writing has a beginning, a middle, and an end. The careful writer gives conscious consideration to the special functions of a beginning, to the special organizational problems of a middle, and to the special jobs a conclusion must perform. The place to start our linkage, then, is at the organizing stage.

First, the writer needs to identify the subject of his piece of writing; the reader should never be forced to read through an entire piece of writing to find out what it is about. Second, the writer needs to identify the topic statement. Next to the subject, the most important thing for the reader to know at once is what is being said about the subject. The reader wants to know the conclusion, and the beginning is usually the best place to state it. Finally, the writer needs to identify the basis of the topic statement. Although the middle of the report will give in detail the basis for the conclusion, the reader should be told at once the nature of the supporting evidence.

Only if the entire writing is anticipated, can organizational patterns be devised. And only if the writer has a clear organization, can he link his ideas together. Good writing is sequential and organized; the writer's links must demonstrate these qualities in his writing.

Logic

Sentences are not only grammatical units, semantic parcels, or syntactical constructions; they are also logical patterns. The three logical steps in clear thinking are segregation, coordination, and subordination. First, the writer must segregate his thoughts. He must exclude from consideration ideas that are not pertinent, facts that are not relevant, and arguments that are not germane. The second step, coordination, involves identifying ideas of great importance and ideas of minor importance; those of approximately equal importance need to be withdrawn for separate treatment. The third step, subordination, requires a recognition that each important topic has subordinate ideas; these subordinate thoughts must not be treated as if they were of the first rank, nor must they be treated out of context of their parent topic.

The purpose of an outline is to organize the writer's thinking. The outline is a way of *saying* segregation, coordination, and subordination. To be useful, the outline must help the writer, first to organize his thoughts into logical groups and, second, to put these groups into logical sequence.

The principle of outlining applies to sentences just as it does to an entire piece of writing, and here, too, the three steps of segregation, coordination, and subordination must be considered. Every sentence is a unit, carefully separated from other thoughts. Coordination may occur at any level, among single words, among phrases, and among clauses. And every good writer knows how to use syntactical coordination skillfully.

We must learn to get full logical power from our statements. Basically, this involves four things: avoiding the incomplete statement, avoiding inexact terms, avoiding mixtures of fact and opinion, and avoiding equivocation.

Style

The technical writer can extend his personality to only a limited degree in his correspondence and perhaps not at all in his reports. But there are ways in which he can improve his writing style.

One way to improve writing style is by sentence variety. The good technical writer avoids the dullness that monotony produces in his writing. He does not repeat the same sentence structure time after time. He varies his sentences from long ones to short ones and from loose ones to periodic ones. And rather than writing only simple sentences, he will include complex sentences, compound sentences, and compound-complex sentences.

A second way to improve writing style is by a consideration of vocabulary. The good technical writer will avoid general, abstract words, jargon verbs, and weak expressions of relationship. He will use simple, straightforward language. He will avoid getting exact, technical words confused with inexact, jargon words. And he will avoid using exact, technical words in writing for the uninitiated, if the words are not in everyday usage.

A third way to improve writing style is by a consideration of levels of usage. The careful writer avoids what may be called pseudoformality. The formality of true dignity exhibits an ease of manner, a smoothness, and a naturalness. Pseudoformality means frequent use of the passive voice, the wordy phrase, and the polysyllabic term. A good device is to listen as we write, and ask if our sentences are ones we should speak when talking to an intelligent, perhaps nontechnical, person.

A fourth way to improve writing style is by a consideration of figurative language. Many words that now denote a purely abstract idea still retain some of their earlier physical meaning, and it is impossible, as well as undesirable, to keep all figurative language out of technical writing. Metaphors, many of which we use unconsciously, are more natural than purely abstract language. As long as we are careful in our use of abstract language, there is no reason to exclude it from our technical writing.

Finally, we can improve writing style by considering sentence rhythm. One reason speech is more effective than writing is that in speech we can stress the right words and pause at the right places. We must strive for a similar rhythm in our writing. Rhythm is loud and soft, rise and fall. Subjects are almost always rises, as are active verbs. Punctuation serves to insist on pauses. Sentence rhythm is largely a matter of feel. By reading aloud what we have written, we can determine the rise and fall of our writing and make the writing more readable by producing better-sounding sentences.

CONCLUSION

This paper has described the course in Advanced Technical Writing as taught at Argonne National Laboratory. Hopefully, these ideas will help other people desiring to establish a similar course. This course has covered some of the essential ingredients of good communication and has made my students realize that the job of improving our writing never ends. Study, reconsideration, and practice still remain to be done.

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From PROCEEDINGS, 1966

A Cure for Writers Cramp In Engineers

R. E. Webb and J. E. Gregory

Writer's cramp can occur in two varieties, we have come to believe, physical or mental. The first is a painful, spasmodic contraction of hand and finger muscles, resulting from excessive use in writing; the other is also painful, and frequently attacks engineers when they are faced with writing assignments. This writer's mental cramp is the malady that we set out to alleviate.

The symptoms of this ailment are easily recognized. One is the squirming about at a desk while trying to fit experimental data into an organization's specialized report form. Another is the frantic search through an unfamiliar grammar book that fiendishly secretes its rules of comma placement. Still another symptom is the frustration involved in adapting a sprawling blackboard sketch into a neat drawing or graph for a report.

It isn't that engineers can't write, or that many of them haven't taken report writing courses in college. It is often true that they prefer to spend their time in laboratory or plant work to which they are more accustomed. The result is inevitable and predictable; some engineers are much maligned as uninterested or even inadequate writers, and they are the ones who generally contract the worst cases of writer's cramp.

Can anything be done for these victims? Definitely yes! We in the editorial staff feel that we have much help to offer engineers whose writing ranges from simple observations to technical articles.

DISCUSSION

On-the-Job Writing Help

We do not teach a formal report writing course, nor do we take over the whole job of writing reports. Instead, we try to develop the engineers' report-writing skills by using our editorial vantage point as a springboard from which to launch a variety of short pamphlets and bulletins containing useful information, helpful ideas, and meaningful examples. By supplying a succession of these eye-catching aids that can be quickly read and understood, we do, in effect, teach report writing on the job.

Regardless of whether an engineer is writing a brief memorandum or a formal report, he can easily

help himself by referring to these aids or by applying lessons he has already learned from one of our bulletins.

Pamphlets and Bulletins

Here are some of the major aids that we provide:

- A pamphlet about words and their local usage
- Bulletins with ideas about illustrations and page design
- Indexes of procedures and reports
- Bulletins with short critiques of local writings

Let's look at a few of these individually to see just how an engineer can use them and receive on-the-job training.

A Pamphlet About Words

We find that most engineers, particularly the new ones, are apt to be baffled by word usage. There is confusion in the spelling, capitalization, hyphenation, and usage of words, especially those generated in a rapidly expanding technology.

To answer our engineer-writers' many questions about word usage, we issued a Word List. This pamphlet is not a dictionary or a rule book that has to be studied, but rather a compilation of about 1000 terms (words, symbols, and abbreviations) that can be kept as a ready-reference on every desk. In addition to local words, unusual usages, or words that authorities disagree on, the Word List also contains some specific examples of word usage and brief explanations of why words are used in certain ways.

Engineers soon learn to rely on this aid instead of wasting time in a fruitless search through a general dictionary for a term like our local *high hat, harp,* or *dog-boning.* We don't want to promote, or even condone, a proliferation of jargon, but new local words sometimes do develop widespread usage, and we feel that we should help standardize the spelling and use of those that are adopted.

Bulletins for Illustrations and Page Design

No one denies that good reports result when well chosen words are well composed. But no matter how good a report may be, its readability can almost always be enhanced by improving its appearance.

A page of type is much more readable when it contains suitable subheadings and paragraph breaks. Stephen Leacock, the Canadian writer, put it this way: "People are attracted to neat pages, broken into trim sections. Set a thing into solid, unending blocks of type, into pages that never break, and few books could get over. Milton's *Paradise* would be lost, and Dante's *Inferno* would look like Hell." [1]

There is also a world of contrast between an easy-to-read report with good illustrations, and the dull appearance of its graphically uninviting counterpart, even though both contain the same words. Good design, however, must begin with the writer. His choices and decisions, if not well conceived, can nullify the best efforts of the editors who try to help him.

With these thoughts in mind, we decided to publicize some fundamentals and techniques of graphic design without writing a treatise on the subject. We initiated a series of one-page bulletins called *How to Improve Your Figure,* each carrying a salient idea. In doing this, we are not trying to disseminate complicated or "fancy" techniques, but we do try to arouse interest in graphic appearance and to stress the value of well designed illustrations. For example, in one bulletin, we pointed out a common fault, the needless use of fine-mesh grid lines that obscure the curve or legend. We said that such a design is good for screen doors — not much else. In another case, we showed how multiple curves on one chart are messy and hard to read. Such a stringy, wiry effect is truly "for the birds." One solution, the drawing of two charts, is readily apparent.

Indexes of Procedures and Reports

An engineer whose work involves technical assistance to manufacturing in one part of our diversified plant may be concerned with details of allied work in another part. He may need to know something about the process, the operation of some special equipment, or what has already been written on the subject of interest.

To provide him with help at his finger tips, we supply indexes in pamphlet form covering (1) procedures for all major manufacturing and service facilities, and (2) all allied reports by title, number, and author.

With the aid of these indexes, an engineer can select and order from central files all that has been written here about the subject. From this material, he can then find the correct terminology, the latest technology, and the approved style of presentation.

Although the training tactics employed here are more subtle than those used with some of our other aids, this aid provides yet another opportunity for learning by example.

Excerpts from Recent Local Writings

Another short bulletin, issued about once a month, has a regular column feature called *Now That the Ink's Dry* in which we second-guess some examples of local writing, paraphrased as necessary to conceal the writers' identity. Critical comments are rendered in a light tone, but they are purposely incisive. One bulletin, for example, may attack the over-use of the nonspecific word *plastic*. It might say that *plastic tubing* can mean anything from macaroni to methyl methacrylate, and it would advise the use of the generic, the chemical, or the trade-mark name. The bulletins are well received and read with considerable interest. It's rather satisfying to profit from someone else's miscue.

CONCLUSION

It takes persistent effort to attain the goal that we've set for ourselves. We strive to reach the annual crop of new engineers as well as to stay in touch with our old customers. To do this, we have to find new material to issue or new ways to repeat some of the lessons covered in earlier bulletins. And, of course, we revise our Word List and indexes periodically to keep them up to date.

Our purpose is not to make polished writers out of engineers but to engender more interest in writing and prove that good writing is not an awesome task. We do this with small doses of ideas and examples which we hope are so pleasing, palatable, and persuasive that even the worst cases of writer's cramp will be cured.

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From PROCEEDINGS, 1975

GM Research Laboratories Improve Chemistry Between Science Writers and Editors

Ernest Mazzatenta

When the GM Research Laboratories tried to bring its science writers and editors together for an in-house course in writing, the result was less than satisfactory. Some of the writers (research engineers and scientists) felt stifled by the presence of their editors (supervisors and department managers). Some editors stayed away because they felt their primary need was a course in editing. With the recent establishment of an Editors' Workshop, both groups now gain the kind of direction and advice they need most. What's more, both are developing a better appreciation of the other's role in the reporting process. And the quality of writing and editing at Research is improving.

"When the man at the top (the reviewer) says it would have been easier (for him) to have written the report in the first place, the statement deserves consideration. When the man at the bottom (the writer) gives up trying to write well because he thinks it will be changed anyway, that too should give reviewers pause."

— Professor Mary Bromage
"Writing and the Reviewer's Role"

When we established our Effective Writing course at the General Motors Research Laboratories in 1970,[1,2] we felt many of our researcher-writers and their manager-editors might want to attend.

After all, the course was conveniently located on the site, classes were held during working hours, and textbooks were provided without cost to participants.

We were right about our research engineers and scientists whose written reports are considered an integral part of the research process here; from the start, they enrolled in healthy numbers. But we were wrong about their managers — the supervisors, assistant department heads, and department heads who reviewed and often changed the writers' copy prior to publication. Managerial participation was, as they say in scientific circles, "minimal."

It also was inversely related to job level. While three or four supervisors might enroll for each course, department heads and their assistants seldom did.

Of course, this distressed some of the participating professionals ("I'm here; why isn't my boss?"); but, after about three years of classes, we who were conducting the program reluctantly concluded that departmental management had several good reasons for not attending.

First, the 12-class, 24-hour program was essentially a writing course and these managers were too busy editing to do much writing, whether inside or outside a classroom. Second, when the managers did sit in on sessions, their presence often stifled discussion and they quickly sensed it. Finally, while our executive management supported our program, it did not specifically ask department managers to attend.

In retrospect, I must say that, under these conditions, I probably wouldn't have participated either. Yet, we realized that the writing course could not be entirely effective until these editors were, in some way, brought into the act. That's when we decided to develop a course expressly for editors, one geared to their needs, yet one which meshed with the writing class.

EDITORS' WORKSHOP

The Editors' Workshop concept we offered to our executive management in late 1973 called for:

- Sixteen hours of classroom involvement (two half-day sessions and one full-day session, spread over three consecutive weeks)
- A schedule of activities which would deal with real life editorial problems and generate possible solutions
- Enrolling a limited group of supervisors and managers in each class but selecting them from as many different departments as possible
- Meeting off-site to discourage interruptions

Our major objective: to place all GM Research writers and editors on the same track with regard to what is either correct, preferred, or allowed in technical writing.

A workshop with such an objective, we pointed out, could bring gains which could not be achieved through the writing course alone, namely:

1. a reduction in the number of drafts which a writer had to complete before satisfying all of his editors
2. a reduction in the number of unpleasant writer-editor confrontations which all too often erupted during review of manuscripts
3. a reduction in the time needed to edit and, thus, the time to expedite the report to the printer

Realizing such gains would be highly desirable, our executives urged us to proceed.

Participation

While putting the finishing touches to our workshop plans, we wrote to those department heads who had previously enrolled professionals in our writing classes and explained what we had in mind. Would they send their supervisors to an Editors' Workshop? Would they themselves wish to attend? In every case, we found them receptive and in many cases, enthusiastic.

That enthusiasm has endured throughout our first year and shows no sign of waning. In the four courses offered during that span, we graduated 49 managers and supervisors representing practically every department. We easily could have enrolled twice that number but purposely kept class size to 12-13 to insure maximum involvement. (See Figure 1.)

COMPOSITION OF THE FIRST FOUR WORKSHOPS

TITLE	1st	2nd	3rd	4th	TOTAL
Department Heads	1	-	3	1	5
Assistant Heads	4	3	2	2	11
Supervisors	7	8	8	10	33

Figure 1.

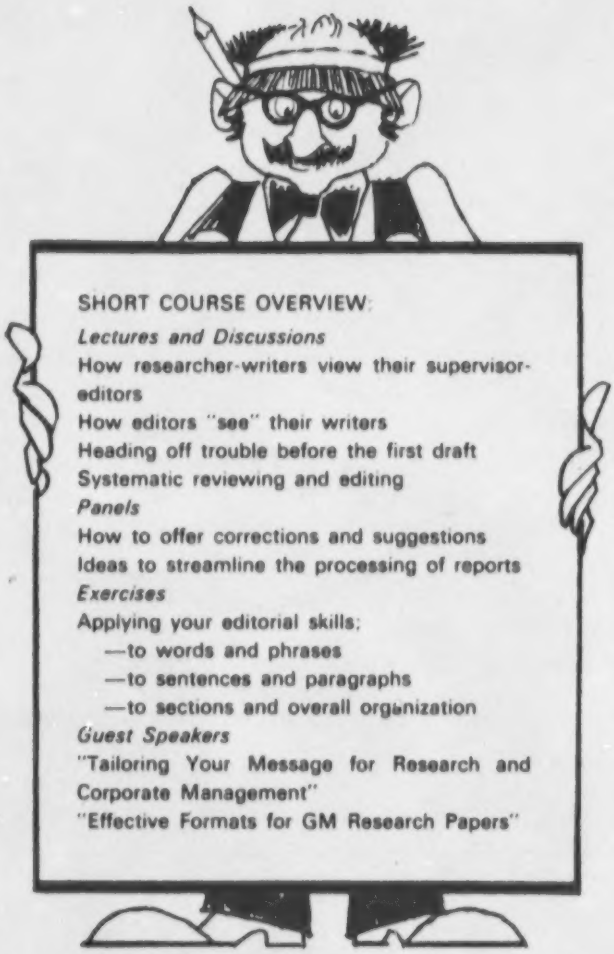
SHORT COURSE OVERVIEW:
Lectures and Discussions
How researcher-writers view their supervisor-editors
How editors "see" their writers
Heading off trouble before the first draft
Systematic reviewing and editing
Panels
How to offer corrections and suggestions
Ideas to streamline the processing of reports
Exercises
Applying your editorial skills:
—to words and phrases
—to sentences and paragraphs
—to sections and overall organization
Guest Speakers
"Tailoring Your Message for Research and Corporate Management"
"Effective Formats for GM Research Papers"

Figure 2.

Workshop attendees not only learn about efficient editorial techniques and procedures; they are expected to apply them in classroom exercises. In panel discussion, they share thoughts about nagging editorial (often human relations) problems and come to consensus on possible solutions. They also interact at length with visiting GMR executives on such matters as the role of the manager in editing. (See Figure 2 for course overview.)

All of this enables our editors to better determine when they should offer suggestions and when they should "resist the temptation to turn their red pencils into stilettos.[3]"

WHAT AND WHEN TO EDIT?

The opening lecture introduces many of the oft-expressed complaints of members of past writing classes, e.g.:

"It burns me no end when a manager's comment is to insert a comma or shift this phrase to the beginning of a sentence . . ."

"Supervisors should be advised on how to edit without inflicting their own writing style or organizational preferences . . ."

"My editor doesn't agree with the conclusions of my report — and handles this as though the report were not clearly written."

These charges usually trigger a welter of counter-charges, followed by discussion, soul-searching, and, finally, some valuable second thoughts. In my summary, I stress what most participants usually acknowledge before discussion ends: that eliminating or easing these gripes will require some giving of ground to the writer.

Before the workshop is over, the editors get many pointers on (and examples of) where they might "back off." Specifically, they learn that they can indeed allow use of both active and passive voice verbs in technical writing, that a mix is usually preferable. They are advised that repetition of a word in a paragraph or even in a sentence is not automatically "bad," that it even might be necessary. And they find that sentences can begin with "And!"

Moving into the area of report organization, we urge editors not only to allow but promote use of the basically informative abstract, as opposed to the descriptive. And we show examples of each to be sure everyone grasps the difference.

Application

What is offered during lectures is reinforced in classroom exercises and individual presentations. (For part of a typical exercise, see Figure 3.) Every participant is expected to bring in an example of his editing for projecting and a class critique.

This is when some learn that they are indeed very picky — or even wrong — when they edit. More than a few editorial perspectives have changed as a result of our class critiques.

Panel Discussion

Panel topics are assigned a week in advance of the actual discussion date so that participants can research the topic. Among the topics are these:

PANEL #1

Based on your own experience, what do you think is the best way to get back to an author with corrections? How long does this ordinarily take? Do you think the review approval system can be improved? Precisely how?

WORKSHOP EXERCISE

On the following pages are some "before and after" statements — original sentences offered by Research writers and revisions developed by their editors. *Put yourself in the writer's shoes* and decide whether the changes are (1) warranted; (2) questionable but not worth fighting about; (3) unwarranted. Be ready to defend your decision during our discussion.

BEFORE: Not only does leakage produce coolant loss, it also allows the coolant to get into the bearing which results in an objectionable, shrill, squealing noise.

AFTER: Not only does leakage produce coolant loss, it also allows the coolant to get into the bearing which results in an objectionable, loud squeal.

BEFORE: The combustion of a lean and homogeneous air and fuel mixture insures a low combustion temperature which in turn causes a low rate of NO formation and a low NO exhaust concentration.

AFTER: The combustion of a lean, homogeneous air-fuel mixture insures a low combustion temperature. This results in a low rate of NO formation and consequently a low NO exhaust concentration.

Figure 3.

PANEL #2

Apart from working more efficiently with the writer, in what other ways can you speed up the publishing process? Urge typists to give handwritten or taped versions high priority? Seek out the opinion of your typists before presenting your ideas as a panelist.

The first panel discussion underlines the need for face-to-face review, for two-way communication, for offering some good news along with the bad, and for asserting confidence in the writer's ability to follow through.

Later, I reinforce the need for two-way communication by quoting from an excellent STC *Proceedings* paper by Sylvia Fourdrinier. In *The Editor as a Teacher,* she reminds us that:

"The supervisor who leans on his authority and insists that changes be made because he wants them will not only bruise the feelings of the writer but will fail utterly to convince him that the changes are desirable." [4]

When we get into the panel on expediting manuscripts, panelists usually bring in and project a copy of their departmental approval or sign-off form; this sheet normally is placed at the front of each manuscript as a means of speeding orderly review and processing within the department.

Some forms are over-engineered; others, models of efficiency. Before the class discussion ends, most participants know which is which.

APPORTIONING — KEY TO PROGRESS

Participants are urged to adopt a systematic departmental approach to editing — one which assures a realistic apportionment of editorial effort within their departments. To this end, we stress that the supervisor should have primary responsibility for editing a report, the assistant department head much less, and the department head, practically none. Simply put, the higher the report goes, the lower the editorial input should be.

Our recommendation is based upon the fact that supervisors are normally closer to the work being described in the report and best qualified to assist the writer.

When this apportionment is implemented, department management gains through a reduction in editorial effort, much of it repetitive. The writers benefit through a reduction in the number of review sessions and rewrites.

We will continue to advocate this course as long as we see it working in those departments which already have adopted it and as long as writers tell us their department heads do far too much editing, even after assistant heads have gone over their reports with a fine tooth comb.

Spin-Offs

Because the workshops stress participation, a good deal of useful information is being exchanged — during class and at coffee and luncheon breaks. To make sure these ideas get out to still others at Research, we compile and print them as "suggestions lists" for writers and editors (See a typical front page, Figure 4.).

HEADING OFF EDITORIAL PROBLEMS

(15 Suggestions for GMR Writers)

While organizing . . .

1. Don't store up material for a number of reports. If possible, write a report as each major phase of a long-term project is completed. The more timely your report, the more valuable it will be.
2. Organize your material before writing; outlining can help you to organize.
3. Discuss your outline with your supervisor-editor. Come to an understanding of the general purpose and specific objectives of the report. Resolve as many questions as possible before you begin a rough draft.

While writing . . .

4. Don't burden your reader with unnecessary information; at the same time, don't leave out data essential to the sense of your message. Keeping your primary readers in mind

Figure 4.

These lists (we've had three so far) are sent to all past workshop attendees and to graduates of recent writing classes.

One workshop participant went back to his department and proposed that additional analyses of department editing be made during the department's regular meeting for supervisors. His department head was receptive and two productive sessions resulted.

Reactions

Workshop participants express their views in two ways: (1) through questionnaires which are completed and returned unsigned during the final session and (2) through subsequent informal discussion with the instructor and his associates.

Plainly, what participants appreciate most is the opportunity to mingle with members of other departments and to work out common editorial problems. (See Figure 5 for a representative sampling of questionnaire comments.)

WHAT DID YOU LIKE MOST ABOUT THE COURSE?

"The systematic approach to editing which was offered."

"Insights gained from our panel discussions."

"The informality which led to a great deal of interaction between the instructor and the class."

"The opportunity to learn of the different ways in which other departments process reports."

Figure 5.

In recent months, I've queried a number of past participants to see whether they have changed their editorial approach since completing their workshops. Here are a few replies:

"I'm not as nitpicky as I once was. I also try to be more specific in my comments. Since the workshop, I jot down on a separate sheet all the good points I find in a paper and then pass these back with the negative ones."

"I don't question as many things now which boil down to being matters of personal choice or taste."

"We are striving for a smoother movement of papers from writers to the various editors; we are trying to clean up our procedure. Part of the impetus was provided by the Editors' Workshop."

While these comments are encouraging, perhaps the most gratifying was voluntarily offered by a young editor-supervisor who attended an early workshop. As we passed each other in the hall one day, he smiled and said: "You know, that course is working for me. My people tell me I'm a much better editor now."

Next: Reviewing and Refining

We plan to replace the limited, random sampling of past participants with a standardized post-course questionnaire aimed at all graduates. This form will be sent about six months after an editor has completed the course, allowing sufficient time for him to apply what he has learned and to gage results.

This questionnaire not only will ask such questions as: "Have you experienced fewer conflicts in review sessions?" but "Why or why not?" Responses should enable us to further establish the value of the workshop and pinpoint strengths and weaknesses.

It would be unduly idealistic to predict that the workshop will some day improve the chemistry between *all* Research writers and their editors. But we have made some perceptible progress and, with continuing refinements and experience, we intend to make more.

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From PROCEEDINGS, 1968

The Pro's of Turning In-House Prof and How to Offset the Con's

Elise Sisk

As an in-house writer/editor you have certain intrinsic advantages when you teach writing in-house: especially familiarity with the engineers you are going to teach, and with the corporation. This means not only readily available documents for discussion and materials for document preparation, but also the chance to make the course serve secondary purposes which add to its usefulness to the corporation. An obvious example is clarification of the functions of Public Relations, Graphic Arts and Reproduction Services. You can offset the problem of limited preparation time by arranging to have the sessions on these topics led by others. To meet your major problem, that of initial indifference, you must learn to make your course a prestige item. Only then will you acquire the honor naturally afforded a teacher from the outside, who is indeed a prophet from another country in the eyes of your in-house colleagues.

INTRODUCTION

It seems to me that there are three important topics pertaining to in-house writing improvement programs . . . what to teach, how to teach it well, and who should teach it. I am going to assume that the "who" is already defined as the corporation writer/editor. My theme will be how to exploit the advantages inherent in being an in-house teacher and how to offset the disadvantages.

KNOW YOUR STUDENTS

As a corporation writer/editor, your major advantage is familiary with the engineers you are going to teach, not only with their writing but also with their working milieu. But, if you don't put this familiarity to work, it may turn out to be a disadvantage, as we'll see later. One way of exploiting your special situation is to use items for in-class illustration that have actually been written by personnel at your corporation.

I myself used almost exclusively exercises based on recent reports and proposals. There was an exercise on "Coherence within the Paragraph System" based on a report on a new receiver, written by one of the engineers who had taken the course. There was an exercise on buried verbs entitled "Wide-Band C-W Detection Using Crystal Video Dectectors." There were paragraphs lacking in unity, coherence, emphasis, simplicity and conciseness; sentences illustrating shift in subject, shift in verb, faulty parallelism, faulty subordination or separation, poor use of repetition, poor use of euphemism; and so on.

In addition, whenever possible, I used selections from in-house reports and proposals as examples of *good* writing. There were good abstracts and introductions, an article on "EHF and the Space Age" to show the proper use of specific examples, a concise trip report, a successful missile launch control proposal, all written by engineers taking the course or by their colleagues. One whole session was devoted to a critique of the successful proposal, the approach being to allow ten minutes for the class to browse through the proposal, and then to question them on its content. The primary subject of the session was document emphasis.

There was just one negative viewpoint on this approach: support personnel complained of having trouble understanding the meaning of the engineering material they had to analyze and rewrite! I had avoided the danger of seeming too non-technical to some, only to end up seeming too technical to others — but fortunately to a negligible number of others.

Your being an in-house teacher permits another technique which would not otherwise be feasible. You can collect the exercises during the week and then mimeograph selected answers for discussion at the next class meeting. This approach permits not only the discussion of exercises when they are fresh in everyone's mind but also the immediacy of using examples from the work actually submitted.

Time consuming, true. But the rewards in terms of class interest and respect are enormous. When I passed out my 2-page list of "Writers' Trouble Spots" referencing our manual and textbooks available in the corporation library, it was treated as gospel, just because I had demonstrated such familiarity with in-house letters, reports and proposals.

I am not going into detail on the manual; suffice it to say that in doing reference to prepare it, I noted an interesting fact: most of the good books on technical writing develop one major theme, which can serve as a basis for one or maybe two class sessions. Put these sessions together and you've got a pretty comprehensive course — in my opinion better than trying to find all that you need in any one book.

KNOW THE CORPORATION AND ITS PROCEDURES

Familiarity with the corporation and its procedures can also be a tremendous help to the in-house writer/editor turned teacher.

Topics intimately related to the corporation served me well as a basis for sessions on outline preparation and selection of main idea. One of these, a "learn by doing" session, was intended to show the dangers of delegating sections of proposals without supplying an outline. I asked each engineer to write up the experience of his department for a proposal for a new

countermeasures system. Every department represented by the class participants would have worked on this imagined new system.

The writings varied from two sentences to two pages, and different information was included in each. A couple of writeups included a description of the department's function and number of personnel, which was irrelevant. No writeup mentioned performance in meeting schedules. A few even failed to cite past customers, contract numbers and dollar value of contracts. The editor of the proposal would have found it impossible to achieve parallelism and emphasis. The engineers taking the course got the point fast, and I think they remembered it.

This session was part of a discussion on the responsibilities of the assigned proposal manager. It was only one of a number of discussions based on an understanding of company procedures.

The original goals of my course as established in cooperation with management actually called for including two additional sets of procedures. The goals were:

- To improve communication with the reader — with special emphasis on proposals.
- To make writing easier.
- To provide a manual of information on writing problems.
- To stimulate interest in writing articles.
- To make known available publication services.

The last two items could be termed more company-oriented than student-oriented. They helped the student, true; but their real intent was to make the job of other support personnel easier by clarifying their function to the engineers.

As actually taught, the course included the requirement of the preparation of an article. Several of these were published, and this led in turn to the stimulation of additional interest on the part of engineers who had not taken the course. So the Public Relations Department was happy. The benefit to the students as writers was derived principally from the similarity between articles and reports: for example, the definition of the article in terms of *Say, you! See? So* —, which means get the reader's attention, relate your material to him in some way, make your point and finally show its significance.

To make known available publication services, discussions of both Graphic Arts and Reproduction Services were covered. There were:

- A session on the effective use of illustrations, including definitions of line drawings versus halftones, cropping, retouching, exploded views, cut-aways, etc. By showing what can be done with rough material, some of this material subsequently reduced the need for new photographs.
- A session on reproduction processes with explanations of line and half-tone reproduction, the use of reproducing and non-reproducing pens and pencils, relative costs of Xerox versus offset printing, etc. There was considerable stress on the minimum time required for the various forms of reproduction.

Still other topics pertaining in general to company procedures called for:

- Use of a specially prepared company standard on abbreviations.
- Use of a specially prepared standard on bibliographical forms.
- Use of an evaluatory card prepared to simplify taking notes on publications. This card was subsequently available in the library for the convenience of the entire staff. It included two check-off lists, one on the type of information in the publication ... *review of published information, experimental results, new theory,* etc.; the other list evaluatory in nature ...

conclusive, superficial, controversial, obsolete, etc.

- Preparation of a personnel resume and a summary of department responsibilities, to include general areas of specialization and particular projects. These were collected at the first meeting, analyzed to give a measure of student aptitude, and then placed in the Technical Publications proposal file.

BE AVAILABLE

I found the preparation of the standards on abbreviations and biographical forms extremely time-consuming. And so was the task which I wish to cite as the other advantage of an in-house teacher . . . being available to help the engineers in the course whenever the need arises. If you're around, you'll find that someone looks you up a couple of times a day with questions.

MAKE IT EASY

The big disadvantage of using an in-house writer/editor as prof *is* the huge amount of time involved, particularly in preparing material for the first run-through. You offset this disadvantage not only by making the course serve many purposes, as already pointed out, but also by using every technique available to make your teaching easier.

Two immediately evident devices are cospeakers and tours. If possible, the topic of publication services available from Graphic Arts and Reproduction should be handled with *both* cospeakers and tours. You may also want to appropriate a speaker from Public Relations on articles and from the library on research techniques.

Another time-saver is the use of such training aids as movies in your course.

To simplify your presentation of in-class illustrations, you should insist on a Vu-Graph projector. With this device, you can not only project the material turned in by engineers without further preparation but also correct the copy while you're discussing it.

Another easy-to-use visual aid, which you may not be familiar with, is the 35-mm slide colored with water color or a magic marker — unneccessary unless you need more than one color to make a point but colorful. Another way of adding color to your lectures is to slip a piece of colored film in the projector along with the slide.

BUILD PRESTIGE

In addition to the huge amount of time involved in following the approach I have outlined, you have another major disadvantage as an in-house teacher. You know, of course, where a prophet has the least honor and what familiarity breeds? To offset the problem of being in your own "country," you must make your course a prestige item. Arrange, for example, to start the course on as high a level as possible: my first group consisted primarily of section managers. Try to get one of the company's top executives to join you at the course kickoff and then see if you can prevail on another to come to the graduation dinner. There you give out diplomas and, if you are lucky, announce the acceptance of a couple of articles. Then, of course, the prestige goes up still another notch when the checks arrive for the articles.

A few go-rounds of the course on this successful note, and you're in! What you're in, I don't know, since you were already in-house. Maybe you're in the hearts of your co-workers? Or maybe just in trouble, because your course will be so popular that it'll become a continuing assignment!

From *Technical Communication*, Third Quarter, 1971

How to Make an In-Plant Writing Course Enjoyable

Terry C. Smith

LEARNING CAN BE FUN if the writing-course student is furnished with problems that are not of the textbook variety. But to make the course fun for the instructor as well, the answers to the problems must be easily graded. This article offers examples of problems that provide enjoyment to both student and instructor.

Workshop or home assignments are an essential part of any in-plant course in effective writing. Not only do they provide students with an opportunity to practice the principles of the course, they also supply the instructor with a positive measure of how well the material is being absorbed.

In selecting problems for class assignment, however, the instructor faces two difficulties. First, the numerous problems available in college texts are usually not suitable for a number of reasons. They may be too elementary, too academic, too old, or without practical application to the particular group of students. Secondly, the answers to the problems must be capable of being evaluated quickly since the instructor may be working a 40-hour week in addition to teaching. These two factors lead many instructors of in-plant courses to design their own problems.

Before discussing some of the problems we use in our in-plant course, *Effective Writing*, at the Westinghouse Defense and Space Center, I would like to briefly describe the course itself. Our course is designed for anyone who writes as part of his job. Therefore it includes letter writing, reports, proposals, technical articles, test specifications, and even military handbooks, depending on the makeup of the class. Typical student types range from the *Albert Einsteins* to the *Alfred Neumans* and hail from various departments such as Marketing, Engineering, Manufacturing, and Technical Publications. The course itself is organized to follow the same order as most writing assignments, i.e., planning, organizing,writing and

review. The assignments follow the same general order.

ORGANIZING

Our first assignment deals with organizing and involves 100 statements taken from a magazine article. The statements have been printed on 2- by 4-inch cards and numbered in random order. (Figure 1.) Students are required to organize the cards into the best sequence and defend their organization. They also must supply a title.

Most students do a surprisingly good job, with some being able to fit as many as 97 cards into a close-knit organization. Of course, different students arrive at different outlines, and this gives us an opportunity to discuss the effects which audience, objective, and approach have on organization. The biggest difficulty the students have is supplying a meaningful title, and this leads to a discussion of titles that "box the subject in" without using too many words and titles that will aid retrieval.

In conjunction with the two sessions on writing, we have the students analyze samples of their writing using the Flesch Readability Nomograph. (Incidentally, we are careful to point out both its benefits and shortcomings.)

DESIGN ANALYSIS

The students are next asked to analyze the design features of the common, returnable *Sprite* bottle. In other words, they are expected to explain the various features as though they were the designer. Although seemingly simple, the problem presents an excellent opportunity for the students to demonstrate both their analytical ability and writing skill. Good papers touch on at least 10 features, with a balance between engineering and marketing aspects. This balance is interesting, since many students tend to go overboard, ignoring either the engineering or marketing aspects, depending upon their area and degree of specialization. On one occasion, a group of research chemists concentrated on the amount of soda ash and other ingredients that went into

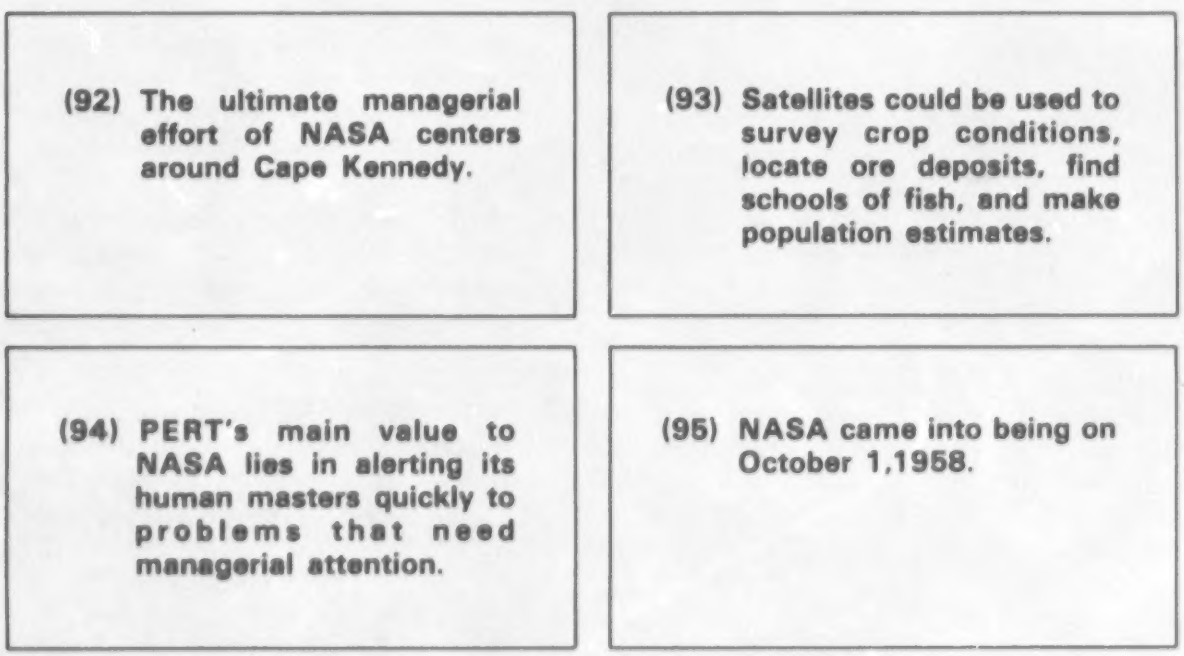
(92) The ultimate managerial effort of NASA centers around Cape Kennedy.
(93) Satellites could be used to survey crop conditions, locate ore deposits, find schools of fish, and make population estimates.
(94) PERT's main value to NASA lies in alerting its human masters quickly to problems that need managerial attention.
(95) NASA came into being on October 1,1958.

Figure 1. Typical Cards Used in Organization Problem.

making the glass. Some of the design features are listed and explained in Table 1.

Table 1. Design Features of the *Sprite* Bottle.

Neck and Mouth. Designed for strength and easy measuring of contents. Ideal for drinking directly from bottle. Can use standard crown seal.

Dimples in Sides. Provide better grip. Size change suggests effervescence. Also reflect light, giving sparkle to bottle.

Green Glass. Ties in with lemon-lime flavor. Protects contents from sunlight. Has cool appearance. Beverages in glass are thought to have better taste by some consumers.

Name. Lively, suggests an elf. Same as sports car.

Symbol. Starburst is also lively.

Period on i. Star suggests vitality and bursting bubbles. (Also suggests ice crystal.)

"By the makers of Coca-Cola." Prestige.

White Lettering. Good combination with green. Suggests snow. Up on neck to increase visibility in cartons and prevent rubbing off in cases. Not covered by hand when bottle is in use.

Shape. Totally distinctive, yet has same over-all dimensions as other bottles processed and sold by same machines. Fits hand well.

A number of common errors appear frequently in the students' analyses. Most papers are not thorough enough, listing only three or four of the bottle's features. Many contain long descriptions of the shape rather than a simple sketch (giving us an excellent opportunity to stress *communicating ideas* as opposed to pure writing). Usually, there is not enough emphasis on the *whys* behind the design elements. Some students overuse the word *container* (which can also mean can, paper cup, etc.) as though they were consciously avoiding calling it a *bottle*. Many jump right into the problem without even a short introductory sentence. Others end without any sort of summary or closing.

EDITING

During subsequent sessions, editing practice is accomplished using current examples from company reports, proposals, brochures, etc. Thirty-four short problems are used. Students work all the problems and present at least one solution for class discussion. A typical problem might include the following:

> *To implement the obtainment of manufacturers' identification code markings on these items, and thereby facilitate consistent and efficient Receiving Inspection procedures, procurement of government standard utility hardware items should encourage manufacturer's identification code marking to be permanently applied to such items.*

I call this 41-word sentence "What did he say?" Can you supply the translation?

LETTER WRITING

Letter writing skill is developed by reviewing a number of letters and by two writing assignments. The first involves explaining a botched job to a customer, and the second is an improvement association letter seeking donations.

The problem of explaining a botched job centers around the guaranty seal (formerly the seal of approval) of *Good Housekeeping* magazine (Figure 2). If you have a keen eye, you may have

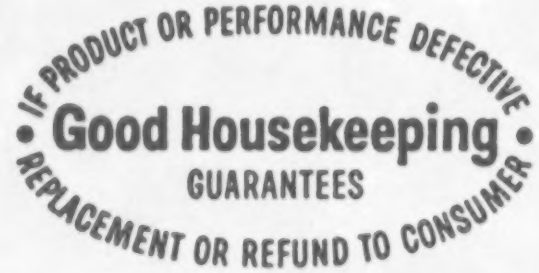

Figure 2. Seal Used in Letter-Writing Problem.

noticed something wrong with the illustration. Right, the star which usually appears in the top center of the seal has been omitted.

Now here's the problem: Let's suppose you are the president of a company that prints seals such as this on sticky-backed paper, and I am the president of a firm that makes Christmas tree ornaments. My ornaments have just been awarded the *Good Housekeeping* seal, and I have given you a rush order to print a million labels to stick on the ornament boxes. The seals have been printed, gummed, and trimmed, and are on your shipping floor. Today is the delivery date, and I have crews standing by ready to work all night in order to meet the Christmas deadline. But, just as the seals are about to be packed, you notice the missing star. The order is for $10,000, and your costs are $8000. If you scrap the seals (or I reject them), you will be out $8000. Write a letter that will convince me I should accept the defective seals!

This problem has been worked on by more than 500 students, and they have come up with more than 500 answers — some good, some bad. The worst answer ever received went something like this:

> Dear Sir:
>
> Here are your seals. Please send the $10,000.
>
> Thank you.
>
> Joe Blank
>
> P.S. You'll notice the star is missing. We're sorry.

Disregarding this all-time low, I have condensed the remaining solutions into a list of do's and don'ts (Table 2). I give students ten points for every Do that appears in their solutions, and take ten off for every Don't. Forty points is a passable score.

Table 2. Solutions to Letter-Writing Problem.

DO's

1. Offer a discount. Even a $2000 discount would enable you to break even.
2. Mention that you've cleared the temporary use of these seals with *Good Housekeeping*.
3. State that, normally, all defective orders are rerun rather than offered to the customer.
4. Comment that the plates have already been corrected, ensuring absolute accuracy in any future printings.
5. Praise the product for having been good enough to merit the seal.
6. Explain why the error cannot be corrected in the time available.
7. Apologize for your error (not just "we made a mistake").
8. Cite past records of quality.
9. Express a strong desire to make good the error.

DON'Ts

1. Don't mention your cost as $8000. This detracts from the "value" of your discount.
2. Don't call the error insignificant.
3. In asking that the seals be accepted, don't use phrases like "I hope you will find them satisfactory."
4. Don't talk about your problems (e.g., inefficient personnel) in an attempt to explain away your mistake.
5. Don't blame the error on the rush. This is like saying "Sorry, we can't handle rush jobs."
6. Don't blame the quality control department or say that the responsible parties have been fired.
7. Don't attempt to make your letter glib or humorous.

Our other letter writing problem places the student in the position of president of a local community improvement association. As such he writes a letter to the local merchants asking for donations of:

Money
Canned goods
Toys
Clothing
Candy

The donations, the letter explains, will be used to make up Christmas baskets for the needy families in the community.

There are a number of twists to this one. The smart students, for example, place money last on the list — almost as though it were an afterthought. They also state they will send a representative around for pickups for the merchants' convenience (and also to ensure they don't forget). Many arrange to put a card listing the donors in each basket; others have the local newspaper donate ad space for listing the donors. One way students lose points here is by writing an obvious form letter. Our list of Do's and Don'ts for this problem lists 20 items.

Incidentally, this problem originated as a true-life situation. The class wrote a letter which was quite successful and netted over $500 in cash in addition to other donations.

OTHER SESSIONS

During the last four weeks of the course,the 2-hour classroom sessions are divided into two parts. The first half is devoted to subjects related to writing such as presentations, artwork, printing, etc. The second half of each session is then devoted to a workshop on the major problem assigned during the course. Students either select a topic from a prepared list or submit one of their own. They also must decide on a format — report, proposal, brochure, technical article, etc. After a week, the student must have a topical outline. By the following week he progresses to a synoptic outline. Then comes the first draft and, by the last week, a final version.

During the workshop portion of each week's class he joins with two other students to form a team which evaluates each other's work. The team evaluation is supplemented by the instructor during class and, to the extent possible, between classes. In addition to reducing the load on the instructor, this teaming arrangement provides each student with a closeup view of what others are doing.

All of these problems are in addition to the two exams and various quizzes given throughout the course. Nonetheless, they are graded. To some, this may seem silly in an adult, noncredit course. However, grading has a significant effect on the "importance" of the problems and increases competition among the students.

CONCLUSION

The idea of section managers, senior engineers, and research chemists competing to see who can write the best description of a *Sprite* bottle or explain away a missing star on the *Good Housekeeping* seal may seem preposterous, but I have seen it happen many times. And everyone had a good time doing it.

From PROCEEDINGS, 1960

Training Young Engineers and Scientists for Written Communications

Margaret D. Blickle

Perhaps it was the distinguished playwright Sir James Barrie who started the rumor that scientists can't write when he said, "The man of science appears to be the only man who has anything to say — and the only man who doesn't know how to say it." All of us have heard variations of this remark which implies that those in other professions can write. Yet, as we all well know, neither good nor poor writing is the prerogative of any one profession. Students in the humanities and the sciences make the same type of errors in sentence structure; they reveal the same incompleteness in contents; they show the same penchant for jargon; the same lack of unity and clarity. Only the subject matter, its viewpoint and tone and form of presentation differ, not the student's ability or inability to write. Admittedly some engineers can't write; but for that matter neither can some doctors, some lawyers, some teachers. Some engineers can't write because they have never had to, some because they don't want to, and others because they think they can't; and in so thinking they build up psychological barriers for themselves. However, a great majority of them have trouble with their writing because they put too little thought, too little time, and too little practice on it.

It would seem that the students' seventeen years or so in school would offer them plenty of time to practice writing and plenty of opportunities to do so. But if these opportunities are offered, they are usually not accepted. Too many students are apt to give their time to those courses they think have practical application. In their early days of training they think that courses in writing waste their time. How often have I heard the remark, "What good is writing to me? I'm going to be an engineer." With some, this skepticism about the importance of writing well persists throughout their college training; others, however, in their fourth or fifth year suddenly recognize the need to write competently, and these think of communication as a real tool to further them in their professional careers. Time alone does not teach them wisdom although maturity helps: their professors of

technical subjects have urged them to improve their writing; job experiences have opened their eyes to the amount of writing required in their jobs; company recruiters have mentioned success in terms of ability to communicate. But until these students have reached this stage of wanting to learn to write, most efforts to train them are lost along their academic way.

WHY TRAINING ISN'T EASY

Even when students are properly motivated, training in report writing is no easy task. Experience has taught us that the course cannot be planned exclusively around a variety of types of reports. In business and industry, these reports are too diversified, and special conditions call for a flexibility in form which must be subordinated to the specific need for which the report is intended.

The choice of a correct form entails consideration for the purpose and the problem, audience and content. Moreover, a study of the types of reports may result in the students' feeling that form alone is the criterion of a good report, whereas clear expression, no matter how it is dressed up, is the ultimate aim. In other words, the students must not be allowed to equate the skillful use of form with effective writing. Nevertheless, most of us recognize with Harold B. Simpson of General Motors that *the form of the technical report is undoubtedly its greatest asset. It is not an accidental form. This structural framework, made conspicuous by a logical system of headings, is always an organic one. It is never a mere clothes horse upon which the garments are hung.*[1]

Consequently though form may be de-emphasized, the report situation must be recognized — that is, the writer must determine whether his report offers information that is to be filed or whether the information is only for temporary use. Does the situation call for the solution of a problem — a suggestion for a change? Does it demand recommendations? Is it for the use of the immediate supervisor, or will it be read by a multilevel audience? Is it intended to go up, down or across? It is the situation that dictates the form. It is the situation as well as the audience which establishes the specific format of a report, although in turn, the format is established by some of the common conventions now widely used in business and industry.

Because the young engineer seldom asks himself any of the above questions and because he seldom takes time to think through his subject, he is very apt to ignore the basic principles of organization. He will sit down with pencil and paper with no thought of an overall plan or purpose of the report and with no consideration for the audience; he writes what amounts to a soliloquy.

IMPORTANCE OF OUTLINING

It is indeed difficult to persuade young writers that pre-organization of a report is imperative, that probably no satisfactory report has ever been written without an outline. Their natural instinct is to excuse themselves by saying they haven't time to construct an outline, whereas actually they haven't the time not to construct one.

Since outlining is a product of logical thinking, one might optimistically assume that engineers and scientists who by their very training are logical thinkers can write successful outlines. Although they are quite capable of devising an orderly procedure to carry out their experiments and projects, they display the most amazing lack of logic when faced with the necessity of putting written material together. They blunder through a report with no plan, and without organization they include all the detail they know thereby smothering the significant points of their report. In fact, they put everything in their report but the meaning.

Without an outline to guide them, they seem to have no sense of proportion, no sense of balance, no sense of unity and certainly no sense of order and emphasis. To indicate to the student that an

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[1] *Form and Style in Technical Reports, STWE Review*, July, 1959. Vol. 6, No. 3, p. 4

outline will acquaint him with these elements is to state the familiar; to teach him merely the mechanical rules to guide him in outlining is to put faith in the superficial; to review the various patterns of outlining such as chronological, inductive, deductive, spatial, etc. rarely solves his particular problem although knowledge of these patterns may set him on the right track.

How then do we teach him outlining? Generally, we have found that it cannot be taught in the classrooms — rather it must be taught through individual meetings. In our course each student is expected to arrange a weekly conference with his teacher in which outlines are planned. Before these plans take shape, however, the student must formulate a precisely worded sentence in which he states the purpose of his report.

Such a statement will suggest to him the major headings of his outline and will guide him in determining proportion and emphasis. Once he has fully stated the purpose, he can see his way clearly to a logical presentation. If he suggests that the purpose of his report is to compare two camp sites as to their location, recreational facilities, and adequate living quarters in order to determine which camp will best suit the needs of the 4-H group from Kokomo, Indiana, he is well on his way to solving his problem of organization. The fact that he may approach his outline in several ways should not trouble him too much, since the guide words *location, recreational facilities,* and *adequate living quarters* as well as *needs of the 4-H group* will direct him in whichever approach he chooses to make. In other words, the purpose itself suggests important ideas which take precedence over less significant details. It suggests order and relationship as well as proportion and balance.

Actually, a third of our teaching is accomplished through individual conferences. During these conferences we criticize the student's writing, we discuss or explain corrections, we interpret assignments in terms of the student's particular area, and we map out his method of procedure. As time-consuming as these conferences are, they are well worth the energy expended. Through them we ultimately accomplish our goals. We feel that the resulting spirit of cooperation between the teacher and the student encourages the student to try to improve his writing. Obviously much more can be accomplished through personal contact than by the personal conflict which so often results from criticizing another's writing.

THE WRITER'S RESPONSIBILITY

Among many topics treated in a course in report writing, one of the most important and one of the most difficult to teach is the responsibility the writer has toward his reader. That his report is a selling device never seems to occur to the student. That in order to sell his idea he must visualize a specific audience, whether an individual or a group, gives him trouble.

Many a student points out that it is virtually impossible to put himself in another's place. Of course, we can sympathize with this attitude because it is hard for all of us to put ourselves in another's shoes. We think we can, but most of us are like the woman who said, "John, if one of us should die first, should I take a trip to Europe?" And I doubt whether the solution to the problem of the audience is as simple as one executive claims he made it. He said that he conveniently set a chair across the desk opposite him in which he placed his proposed audience. To this chameleon-like apparition he dictated his letters and directed his reports.

Such a solution is a little too much for the typical engineer or scientist who insists that imagination is for creative writing, not informative reporting. But the fact remains that he must conjure up a picture of his audience if he is to write a convincing report. In effect he must say to himself, "Now, Mr. Johnson knows nothing about this project. Just how much must I tell him or how little can I tell him? How is he going to react to my conclusions? How much technical language dare I

use?" The answers to these questions plus a good many more must be established before he starts to write.

Obviously there is always a danger in determining the solution to these questions. The writer must neither underestimate nor overestimate his reader's background and experience. If he underestimates the reader, he annoys and alienates him. Nothing provokes an audience more than being talked down to. Herman Hickman, the famous Yale coach found this out when he used to gather together his football players for his pre-season talk. He would pick up a football and say, "This is a football." Invariably from the ranks some husky voice would say, "Not so fast, Coach, not so fast."

Overestimate the audience and communication breaks down completely. Apparently, the engineer is more apt to overestimate his audience than to underestimate it. Too often he forgets that he is the expert on the subject and that he cannot rely on the reader to fill in the gaps or to unravel information that should have been expressed more clearly and more completely. Somewhere he must find the cross-over point between overestimating and underestimating the reader's background. We cannot teach him to do this. We can simply alert him to the necessity of considering the audience.

THE ULTIMATE GOAL

Ultimately, of course, teaching report writing boils down to improving the students' competence in writing. All discussion of form, organization, and audience are the periphery to this major goal. The student is too often unable to express himself, and when he does, he cannot recognize wordiness or jargon, clumsy sentences, and problems in sentence structure. As a result, any training in written communications must emphasize clarity of expression first.

Without clarity all other goals are superficial. Nor can we teach good writing by merely emphasizing the elimination of errors or by acting as editors for student papers. We can offer students only guided practice with innumerable short as well as long pieces of writing. It is write, revise, and rewrite that we stress.

One doesn't teach a course in report writing without misgivings. After all does anyone ever teach students to write? Doesn't one attempt to define and sharpen a student's ability, if he has any, rather than try to teach him writing from scratch? To think that by meeting students two or three times a week for ten or twelve weeks a quarter an instructor can teach them to write ordered, intelligent, clear sentences is to demand the impossible. The statement "if you want to write well, have a different mother and father," seems, in one's disillusioned moments, all too true.

Furthermore other complications arise in addition to this almost philosophical question of the ability of the teacher to teach. The teacher is constantly troubled by the variations in his students' abilities. To reach the brilliant student who requires only individual guidance, to reach the mediocre student who will sacrifice all and pretend all for a grade, to reach the poor student who would rather be anywhere but in the classroom taxes the ability of the most competent teacher.

One cannot gear his teaching to the elite only — nor can he bore these students by addressing the lowest level. To steer the middle course is clearly the desired direction, but the direction is not always easy to follow.

THE TEACHER'S RESPONSIBILITIES

Moreover the teacher must always consider the various attitudes of the students which range from real eagerness to learn to genuine indifference. In a report writing course, the student's indifference is often strengthened by his feeling that the English teacher can't understand his material anyway. How can a teacher trained in the humanities follow the complexities of "The Significance of Ionic Constitution of Fibers Upon

the Chemical Durability of Various Glass Fibers"? How can the English teacher, appreciative of the deliberate ambiguities of a T. S. Eliot, be sympathetic to the directness of a report on "Crop Drying"?

Admittedly an English teacher often doesn't understand the details of a complex technical project, although to be sure he often gains a certain amount of technical competence because ultimately the subject matter of the technical reports is repetitive. Yet his very need to follow essentials enables him to spot serious omissions. He can readily recognize the incomplete explanation, the procedure which isn't totally detailed; the conclusion which isn't validly defended is manifest to him whereas the student to whom all of this is familiar is unaware that he has implied rather than stated clearly.

Furthermore a reader trained in the technical sciences is not needed to detect the familiar errors in sentence structure. By his very training, the English teacher recognizes the awkward phrase which is ambiguous, the inexact word which communicates little. One does not need full technical knowledge to perceive the frequent characteristics of technical jargon, the smothered verb, the overuse of nouns, the overabundance of qualifying phrases.

One does not even need a technical background to straighten out the student who writes: "The objective of this project was to find the factors that cause color in the manufacture of mylar" when more precisely he meant "the purpose of this project was to determine the major causes of yellowing in mylar film."

What I'm really trying to say is that despite the difficulties, an English teacher often has much success. In an age where scientific writing almost overshadows other types, the teacher of technical writing does his part in making this writing clear, direct, and emphatic. Overcoming the barriers between himself and his students, he inspires the students with a real desire to write with precision. At the end of a course in exposition many students have improved their writing, and all students have learned the difference between the shoddy sentence and the precise one.

Nevertheless, in fairness to the English teacher, all of us might remember that teaching students to write is by no means the job of the English faculty alone. Too many times the English teacher is asked "Do you mean to say that this student who can't even spell passed English?" as if the student's inadequacies were attributable only to his lack of training in English. Yet clearly one, two, or three English courses cannot eradicate a whole lifetime of sloppy language habits.

The responsibility for graduating literate students must be shared by the whole university. The student cannot be faced with the stringent demands of the English Department only to find that his professors in engineering, sociology, and economics accept the second rate. The first rate only results with the combined and knowledgeable efforts of the University as a whole.

Somewhat the same problems apply to the young engineer or scientist in industry. If he is allowed to submit to the editor hastily written, disorganized and imprecisely worded material, he will gladly do it. If his boss does not demand carefully prepared reports, the young engineer will offer him whatever he thinks he can get away with. If he can offer sketchy incomplete material today, tomorrow it will be even less satisfactory. He will write ineffectively because he doesn't have to write effectively.

Only if the engineer is expected to turn in acceptable reports will he give them the attention and time they need. In other words, demand the best in writing and you'll get the best — at least the best the writer is capable of. It's true it may not have the clarity and delightful humor of William Beebe; it may not have the polish of John Tyndall; it may not have the refinements of Thomas Huxley.

But at least it will represent the maximum, not the minimum application of writing skills.

The results may then be what industry has been looking for: reports that are above all accurate; reports that come directly to the point by means of clear, concise presentation of the material; and even — someday — reports that are alive and exciting as well as accurate and informative.